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UNIVERSITY OF ALBERTA

LEARNING TO TEACH WITH COMPUTERS : TEACHERS' PERSPECTIVES FROM THE INSIDE

BY

HAYA LACHMAN ©

A THESIS SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND
RESEARCH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

EDMONTON, ALBERTA
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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and research for acceptance, a thesis entitled **Learning to Teach with Computers: Teachers' perspectives from the Inside** submitted by Haya Lachman in partial fulfillment of the requirements for the degree of Master of Education.

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Dedication

To my parents **Sarah** and **Ephraim Barnholtz** for cherishing and valuing education, and for encouraging me to pursue it.

Abstract

Computers are now part of the culture of most schools. For teachers it means encountering innovation and change. This is particularly true for experienced teachers. This study explores the thoughts, actions, and feelings of two experienced teachers who began to teach with computers. It focuses on the centrality of contexts as well as of the teachers' unique personal practical knowledge, in the process of making meaning of their computer experiences. The stories of the two teachers, lived and told, highlighted the need to offer teachers voice in the decision making process regarding needs, time, environment, and manner of incorporating computers into schools.

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I am grateful to the nurture and support offered to me by the community of the Center for Research in Teacher Education and Development, at the Faculty of Education.

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"He who learns from his fellow-man a single chapter, a single halacha, a single verse, a single Torah statement, or even a single letter, must treat him with honor".

Ethics of the Fathers

Introduction

Computers, probably more than any other educational innovation, were received with intensity and embraced by a wide spectrum of educational communities as well as the general public. They arrived with the authoritative voice of advanced technology attached to them. Many enthusiastic advocates of computers, mostly outside the educational system, focused mainly on the machine and its software. They paid little attention to the effect it may have on the life and culture of classrooms. Even within the educational system the emphasis was on acquiring computers, setting up the physical environment, and looking for proper software. Less consideration was given to the people who interacted with the machines within schools: that is, students and particularly teachers.

Introducing computers into schools implies change. In most cases teachers are involved in this change process even before computers actually enter the schools. Teachers become part of, although not always partners to the process immediately following the decision to incorporate computers in school. I am reminded of my own experiences with them. During the year prior to my coming to the University of Alberta, the teachers in my school in Israel were informed that we were to receive computers during the course of the year that would be used the following year. Two things came to my mind at that time. First, we were informed about the "arrival" of computers but were excluded from the decision making process regarding the introduction of computers. Second, I recall the burst of apprehension and feeling of alarm with which the "news" was received by the teachers. The "handed down" announcement about the innovation that was about to enter our lives "shook" us and left us feeling threatened and resentful.

When I joined the graduate program in the Department of Elementary Education, I decided to make computers part of my studies. My first encounter with computers did not follow the path I anticipated (some of the experiences I had with computers are described in Chapter One). The experience I had with computers in one of my courses highlighted the experience I had with the news of the "arriving" computers in my school in Israel. As unpleasant as the initial experience was, I am grateful for my encounter with computers both at my school and at the university because it evoked my interest in what later became my research quest.

During the two years of graduate studies, I came across numerous areas of studies, many of them enlightening and exciting. However, the most fascinating area to me was the work in the area of practitioners' knowledge and teachers' knowledge in particular, an area which addresses the issues of teachers' thoughts and ways of knowing. Personally it brought to light aspects of teaching which I had perceived to be part of the "private world" of teaching. It made me wonder about the personal dimension of teachers' initial interactions with computers. I learned about narrative and the new possibilities it entails for teachers in their practice. These issues of teachers' knowledge, story, and narrative in the context of encountering computers guided my thinking and my study. Hence, it seems only natural to begin my research quest into the meaning two teachers made of their encounters with computers with my own narrative beginnings.

CHAPTER ONE

Narrative Beginnings

The seed of teaching

It was the month of August when our family moved to the new neighborhood. The whole complex of apartment buildings had been recently completed so all the families that lived there were new as well. As often is the case in my country (Israel), support services to a new neighborhood lagged behind and, come September, the school building was not ready. As a temporary arrangement, two vacant apartments were transformed into a "school." To make things worse, the two apartments were in two different buildings with quite a distance between them. Grade 1 students were in one building, and Grades 2-4 students were in the other building. The physical conditions were far from ideal, but everyone had to make do as there was no other choice. Now, when I look back upon that period of time, I believe that in spite of all this my parents, as well as others, were quite grateful, and felt lucky to live in that brand new neighborhood. Most of the families in that community were immigrants from Europe who had lived in Israel for only a few years. They were thankful to be alive in their own country and did not seem to mind some inconveniences.

I was nine years old and entered the fourth grade, the senior class of our temporary school. About three weeks into September, our teacher came in one morning and said that the Grade 1 teacher was sick and there was no one to take over her class. Since we were the senior class in our school, the teacher said that one of us, that is, a Grade four student, would substitute for the absent Grade 1 teacher. Our teacher looked at us with an observant eye. She focused on me and said something like "Haya, would you mind going over to supervise Grade One for two hours, when someone else will replace you?" Being as shy as I was, I wished I could have crawled into a crack in the floor or become invisible. My first thought was "why me?" But I did not say anything because doing so would have required courage on my part. I stood up and said that I would go. Now I was all by myself crossing the dry field that lay between the two buildings, wondering in panic what I was going to do when I entered the classroom.

Many years have gone by since that experience but I still vividly remember the moment I entered this Grade One class. I stared at the thirty or forty sets of eyes. They stared back at me. I told them that their teacher was sick and that I was there to replace her. Even though I was excited, nervous, and frightened, I still remember some of the things we did that particular morning. The students asked me about their teacher. I remember asking them what they had done in class on the previous day. They told me, all of them speaking at the same time. I recall telling them that there was a better way to speak, one by one and when called upon. I suppose I was acting on my own understanding of the behavior of a "model" student. To my surprise they calmed down.

Since we were close to our holiday of harvest, I wrote on the board a short poem related to the holiday. After I finished writing, a little girl cried out: "But this is not the right way to spell that word!" She called out the misspelled word. At that moment, I received my first lesson as a teacher, that is, just because one stands in front of a class does not necessarily mean that her/his knowledge cannot be questioned. As a child, I always took pride in my spelling. I was not embarrassed by the little girl's remark. I knew there were two ways to spell that particular word and I told that to the students. They didn't seem impressed. Another little girl said right away, "But this is not the way our teacher spells that word!" That was my second lesson for the morning. A classroom teacher is probably the most knowledgeable person in the eyes of her students. I found that this knowledge remains as valid now for me as that first morning I was 'the teacher'.

I do not remember much about the rest of the time I spent in that classroom. We read a story and practiced some math. I do remember though that when one of my classmates arrived to replace me, I left the classroom and hopped happily all the way back to my class. My mind was set. I wanted to be a teacher! I was going to be a teacher!

Now when I reflect on my experience that morning, I can find no explanation as to where I had found the courage to execute the role of teacher in that classroom. The more I think about it, the more this incident appears to be a kind of microcosm of my experiences as a teacher. On that morning in September I had to overcome a number of what seemed to be insurmountable hurdles. I had to enter an unfamiliar classroom with a large number of unfamiliar students. I had to stand in front of the students and find something worthwhile to say. I had to come up with activities interesting enough for the children to enjoy and to cooperate in completing. I had to respond to the children in a respectful way so they would want to share an extensive period of time with me. These same hurdles seem to be part of my knowing of teaching each time I enter a new class.

I have been teaching now for nineteen years. Being caught in the daily routines of teaching, I do not often take time to reflect on my past experiences. But I know that on that September day, at nine years of age, the plot outline, the seed for the story of my professional life had been planted.

Encountering computers

Now over thirty years later, I again find myself learning how to teach. The first year of my graduate program was a year of many new experiences. New concepts that I have not encountered before became part of my daily vocabulary. Many familiar concepts gained new meaning and required new insights on my part.

One of my experiences stands out as most traumatic. It was my first encounter with computers. When I arrived at the University of Alberta, I decided to take some computer courses as part of my Master of Education studies. I had absolutely no experience with computers up to that point. I wanted to explore this medium because I realized that computers are becoming an integral part of schooling. Since I have always tried to keep up to date with new ideas and methods in education, I felt I ought to do the same with computers and I registered in an undergraduate computer course.

My first computer class is vivid in my mind. I found myself in the largest auditorium in the Education building, with over one hundred students in the class. Almost all of them were young with only a handful of more mature faces. The instructor stood up front next to a computer and a large screen. The class started and for the next three hours I was bombarded with dozens of unfamiliar concepts. I was overwhelmed by the fast pace of movements on the keyboard that was reflected on the screen. I was totally bewildered. Three days later I had my lab session in which I was supposed to put theory into practice by carrying out the assignments. Here I was, an experienced teacher of almost twenty years of teaching, seated in front of a machine about which I knew nothing. I looked around me at all the young eager faces. They appeared to know exactly what to do. I sat there wondering where I could get help. Nothing in my past knowledge and experience prepared me for this new situation. Nothing I knew and cherished as valuable had any relevance to what was happening in the computer lab. Two understanding teacher assistants with unlimited patience helped me to come to terms with the machine.

As I now reflect upon that experience, I view it as a turning point in my life. I 'awakened' to the realization that some well-intended educational experiences may turn out to be anything but educational. I am trying to understand what turned that particular class into such a frustrating experience for me. It was not like trying to cope with a demanding book. It was not even like being challenged by a new theory in a familiar area of interest. I was expected to master, in a very short time, a totally new medium without being able to connect this new medium with my past experiences or any relevant previous knowledge.

The genesis of the research question

Although I found ways to come to terms with computers, this experience left me with many unanswered questions. Is there a better way for a teacher, novice to the field of computers, to experience this medium? Am I alone in having such an experience? What do other teachers experience when they face computers for the first time in their classrooms, rather than in a university situation? How can I come to learn to teach with computers in a meaningful way? The questions settled into my mind with much persistence. It became apparent to me that they were not about to be dismissed. What is it that an experienced, self-confident teacher like myself goes through when a major intrusion in the form of computers enters her life?

When I was asked by my friends and colleagues if I had found a topic for my research, I answered that I did not have to look for a topic to research. The topic presented itself to me forcefully, demanding my attention. It felt like someone was pounding on my door. I had no other choice but open the door. I became passionately interested in the way teachers *feel* and *live* through their experiences with computers. I wondered if my story was entirely unique or whether other teachers were living similar stories. These were the questions I wanted to investigate in my research.

It had been suggested to me that I explore my own experience for my research. I immediately rejected this suggestion. My own lived experience was too close to the present, too painful, and much too frightening for me to examine closely. I had to distance myself from that painful period to be able to confront my own experience. I wanted to talk with other teachers to learn about their experiences of learning to teach with computers.

Thus, my story of experiencing teaching for the first time, and my story of first experiencing computers led to my quest to gain insight into, and understanding of, the ways teachers learn to work with computers and learn how to teach with computers.

CHAPTER TWO

Literature Review

When a decision is made to incorporate computers into a school it means that the school is opening its doors to an innovation. It also implies change. In this study, I explore teachers' experiences of beginning to teach their students with computers. How do the teachers experience this innovation and how do they make meaning of teaching computers? How do teachers cope with computers and what are the resources they draw upon in doing so? Research literature in the areas of innovation, change, and teacher knowledge provide the context for my study.

Innovation and change

Each day, when a teacher enters her classroom, she and the students are involved in a process of change. Changes evolve gently, in a subtle way, over a long period of time. Changes can, however, also be mandated. Prescriptions for change can be handed down with detailed content, strategies and timetables. The former kind of change rarely gets noticed outside a teacher's classroom. I would like to refer to it as "hidden change". This form of change is rarely discussed and rarely documented. It is mostly ignored. The latter form of change is impossible to ignore. It is widely published by policy makers and school boards; it is discussed in the media; and it is enthusiastically studied by researchers. The relevant literature about innovation and change is, for the most part, about this prescribed, "top down" innovation and change.

The issue of innovation and educational change has received wide attention by researchers. One approach to educational change is derived from the view that the school structure and organizational factors greatly influence an innovation and its fate in classroom practice (Fullan & Pomfret, 1977; Fullan, 1982). The implementation of an innovation is described as a highly complex process that involves relationships between "users and managers, various groups of users in a process challenged by inevitable conflict" (Fullan & Pomfret, 1977 p. 390). McLaughlin and Marsh (1978) in their review of the Rand Study, discuss the links between organizations and implementation of innovations. One of the suggestions made by the Rand Study stresses the importance of looking at the organizational context. "Successful implementation was also dependent upon the organizational climate and the leadership of the school ... from the initiation to the effective institutionalization of an innovation, organizational factors play a vital role" (McLaughlin & Marsh, 1978, p. 90). Miles (1964) labeled the forces that he believed to be crucial in regard to change as 'systems'. According to Miles, the social systems are closely related to change, thus involving in it persons, groups or organizations: "What we must remember in examining the problems of educational innovation, however, is that nearly any innovation attempt will be conditioned by forces at work within or between subsystems of the general sort ... educational agencies themselves, government systems influencing these, and a wide range of commercial and non-profit organizations" (Miles, 1964, p.39).

The impact of structures and systems and the lack of control teachers feel over mandated innovations are described in Erickson's (1988) study. Teachers expressed feelings of "being held hostage", that is, "teachers feel locked in their teaching assignments by their desire to make the program work and/or by their desire for job security" (1988, p. 10-11). It gave the teachers a sense of being held captive in a situation in which they had very little or no control over the innovation. Teachers interpreted the administrative perspective as exploitation because "it 'used' them to accomplish administrative goals rather than taking into consideration the context in which teachers work and teachers' rationale for their ideas and actions" (p.18).

Other researchers have stressed that the structure of the educational system has very little bearing on classroom activities. It is teachers who play a strategic role in what takes place in classrooms (Martin & Clemente, 1990). While policy may be set by a school board or a superintendent, instructional practice is mostly determined by the teacher after he or she closes the classroom door. The fate of an innovation, according to this view, is similarly dependent on the teacher. Clark and Peterson (1986) found that teachers' attitudes toward a particular innovation is crucial to the success or failure of its implementation. The higher the value teachers place on a given innovation, the more successfully that innovation is implemented. Others state that innovative practices are highly implemented if they are perceived as congruent with the philosophies of individual teachers (Berman & McLaughlin 1975; Erickson, 1988; Clark & Yinger 1977; Doyle & Ponder, 1977-78; Mohlman, Coladarci & Gage, 1982; Brown & McIntyre, 1982; Stein & Wang, 1988). Doyle and Ponder (1977-1978) submit that the extent to which teachers will attempt to change classroom practices is guided by four aspects of congruence:

1. The "practicality ethic" of teachers, that is, when a change is proposed teachers decide whether or not that change is "practical" and that judgment determines whether the innovation will be implemented.
2. The threat the innovation poses to the student-teacher relationship.
3. Student reaction to an innovation, that is, whether the change will result in students' increased interest and learning.
4. The source of the innovation or where it was originated.

The World Confederation of Organizations of the Teaching Profession (WCOTP) conference (1984) concluded that innovations are to be considered positive "only if they are consistent with the objectives which are regarded by teachers and their organizations as necessary starting points for educational policies" (1984, p. 69). Another conclusion stressed teachers' involvement in the process of change: "teachers must be involved in the definition of the objectives of an innovation, the determination of its content, the design of the methods to be used and the structures to be put to place, and the evaluation of the results" (1984, p 69). Cuban (1984) offers a similar view about the involvement of teachers in change. He talks about having teachers become "active collaborators" in the process of change. Others suggest that administrative and peer support are another important factor in helping to foster change (McLaughlin & Marsh, 1978; Fullan, 1982). The nature of the innovation itself also bears greatly upon its implementation (Brown & McIntyre, 1982; Erickson, 1988; Martin, 1988).

Some researchers regard change as a process following several stages. It is an evolutionary process which progresses gradually and, therefore, it is achieved only in stages. Thus, according to this view, teachers go through different stages in their perceptions and feelings towards change (Miles, 1964; Hall, Loucas, Rutherford & Newlove 1975; Hall, 1975; Hall & Loucks, 1977; Fullan, Miles, & Anderson, 1988). Hall (1975), for example, offers three main stages of concern an individual goes through when first encountering innovation: self oriented concerns; task concerns; and impact concern. It appears there is a prevalent notion that if teachers are properly helped and encouraged through the stages, change will occur successfully.

Other literature presents teachers as conservative and resistant to change. Hence, according to this view, they are the key factor in determining the ill-fate of innovation and change. Lortie (1975) states that "Teachers have a built in resistance to change" (p. 235). Ognibene (1989) describes schools as traditionally conservative institutions, adding that "those who are drawn to work in them do not typically value rapid change as a virtue" (p.3). This observation is suggested as one of the reasons teachers express disappointment with computers. McLaughlin and Marsh (1978) report that in the Rand Study teachers with many years of experience found it difficult to bring about change in their teaching behaviors. Cuban (1986) suggests that "teacher selection, training, and experience and the beliefs teachers hold combine to produce a deep-seated conservatism, a reluctance to alter prevailing practices and use mechanical devices in classrooms" (p. 59). The perception of teachers as conservative has been suggested as one way to explain teachers' behaviors and practices regarding change.

Many of the general views about innovation and change also apply to the introduction of computers into schools. Some believe that incorporating computers into classrooms depends upon acceptance by the classroom teachers (Wright & Campbell, 1987; Heller & Martin, 1987). They propose that the potential of computers in classrooms will be realized only when teachers "move" beyond the self-directed, personal level in their concerns. Peer support among teachers is also emphasized as a way to help reduce teachers' self concern. Elsewhere, Martin (1988) wrote that the individual is the key factor in implementing computers. According to her the individual is more important than institutional structure and the characteristics of the innovation .

Literature in the area of teachers' thinking suggests that teachers favor a humanistic approach to instruction and emphasize the importance of relations between themselves and their students (Clark & Peterson, 1986). Ognibene (1989) and Cuban (1986) maintain that among the reasons teachers tend to resist innovation, such as computer use in classrooms, is that computers present a threat to their interpersonal relationships with students.

From the review of this literature it appears that mandated change is brought into the classrooms from "out there" or "up there", and it is "done" to teachers. Mandated change is sometimes viewed as "shoving change down their throats" (Fenstermacher, 1987). Fenstermacher offers a different approach. He argues that teachers ought to get access to new knowledge or innovation to assist them to work out the consequences and implications of change in their own settings and contexts.

It appears to me that the reviewed research revolves around three main issues:

1. A description of innovative programs and change in the educational system focusing on explaining their success or failure.
2. A search for, and suggestions of, optimal tactics, strategies, and models for what was perceived to be successful implementation of innovation and change. A great deal of this literature focused on the teachers' role in fostering what the change agents perceived as successful change.
3. An attempt to open spaces and give voice to the teachers, their perceptions, thoughts, and feelings about innovation and change, and the meaning they make of it.

It is the latter approach that appears to me as an important one. As a teacher I have experienced many changes. Most of them emerged and were shared between my students and myself. Rarely was I asked for my opinion or my feelings in regard to handed-down innovation and change. Thus, I lived in a split world: the "private" world of my class which was a dynamic, ever-changing world, and the "public" world outside the classroom, one that was a prescribed part of the educational system. The latter was the world where only mandated change was regarded valuable. In the private world I assessed, examined, tried out, and made decisions about what made sense to me as a teacher. In the public world I was often "called to the banner" of change. This meant receiving prescribed agendas, strategies, and time tables for execution. Being part of the educational system, I knew my role. I took part in the mandated changes and often paid lip-service to what was expected of me in terms of changing practices and implementing innovations. I might have been described as one of the teachers who was having change shoved down her throat. However, I am not sure how much the mandated change influenced my practice in the way the implementors, policy makers, and change agents intended.

Teachers' knowledge

It appears to me that an important aspect, directly related to teachers themselves, is missing from the research on innovation and change in education cited above. For some time now there has been a growing interest in research on teachers' knowledge. Research in this area examines and describes teachers' ways of knowing and offers a new understanding of classroom practices. Elbaz (1983), in her work on teachers' practical knowledge, suggested that this knowledge is far more than teaching strategies and subject matter theories. For Elbaz, practical knowledge "encompasses firsthand experience of students' learning styles, interests, needs, strengths and difficulties, and a repertoire of instructional techniques and classroom management skills. The teacher knows the social structure of the school and what it requires of teacher and student for survival and success; she knows the community of which the school is part, and has a sense of what it will not accept. This experiential knowledge is informed by the teacher's theoretical knowledge of subject matter, and of areas such as child development, learning and social theory" (p. 5).

Connelly and Clandinin added to this view the aspect of teachers' personal past histories and the ways teachers experience the world. These involve feelings, experiences, and orientations of time and place. Personal practical knowledge is "experiential, embodied, and reconstructed out of the narrative of a person's life" (Connelly & Clandinin, 1985, p. 183). Narrative unities refer to practitioners' ongoing private and professional life experiences. A teacher reacts in a particular way at a given time and situation "drawing on experiential images, habits and bits of experience, including those of conceptual origin" (p. 183). Bruner (1990) holds that people create specific meaning within larger contexts. "People do not deal with the world event by event or with text sentence by sentence. They frame events and sentences in larger structures... These larger structures provide an interpretive context for the components they encompass" (p. 64).

According to Connelly and Clandinin, it is the personal practical knowledge that teachers call upon to act in a situation. Re-collection occurs through a process of crystallization out of the narrative unities of their life experiences. Personal practical knowledge emerges in the flow of practical activities; it is directed towards ends; and it is context dependent (Connelly & Clandinin, 1988; Johnson, 1989; Schön, 1983; Clark & Lampert, 1986). Personal practical knowledge is a "moral and aesthetic way of knowing life's educational situations" (Connelly & Clandinin, 1988, p. 59). The moral aspect of teachers' knowledge is also acknowledged in Elbaz's (1992) work. She reclaims an aspect of teachers' knowledge that appeared to have been overlooked by concentrating on the cognitive aspect of teachers' knowledge. Elbaz identifies three aspects of the moral in teachers' knowledge: a sense of hope, attentiveness to particular students, and caring for difference among students.

Schön (1983, 1987) and Smyth (1987) describe a shift in the view of knowledge, a shift from "technical rationality" as the only way of knowing toward a consideration of artistic and intuitive knowledge as of equal appropriateness. Schön uses the term "knowing in action" to refer to the "know-how" professionals reveal in their actions. For Schön, as well as for others, knowing is dynamic, it is in the action itself. Alng similar lines Woods (1987) writes about "orchestration" to describe the skill teachers employ to blend actions together into a harmonious whole through practical theorizing. This conception of knowledge, according to Woods, is not an "extant body of facts and theories, but a living experiential, processual, flexible, creative, compilation of insights, memories, information, associations, articulations that go into resourcing on-the-spot teacher decision-making and action" (p. 122).

In reviewing the research on teachers' knowledge, Johnson (1989) concludes that, at a minimum, this research shares a concern with how a teacher's entire understanding and experience of her world come to play a role in what happens in school.

I feel that the kind of knowledge described above is the source upon which teachers draw in their daily practices. I propose that this is the knowledge called upon whenever teachers are faced with the innovation and change brought about by their encounter with computers in the classroom.

CHAPTER THREE

Methodology

I regard teachers as knowing practitioners whose knowledge is expressed in their actions (Connelly & Clandinin, 1988). Thus, their actions present a unity of theory and practice. As computers are introduced into schools, I believe teachers make sense of them through knowing-in-action (Schön, 1983), their personal practical knowledge (Connelly & Clandinin, 1985). In this study I explored the ways in which two experienced teachers made sense of their beginning to teach with computers.

Teachers' individual experiences and the ways they make sense of these experiences can best be explored by naturalistic inquiry which focuses on meaning individuals give to experiences in context (Merriam, 1991). A naturalistic inquiry opens spaces for teachers to tell their own stories in their practices and in conversations. These lived and told stories constitute experience (Clandinin & Connelly, in press).

I have chosen to describe the experiences of the teachers with whom I engaged in my study from a "narrative inquiry" perspective. According to Connelly and Clandinin, "narrative inquiry " is "the study of the ways humans experience the world" (1990, p. 2). Narrative inquiry is the telling of educational experiences by restorying it, by "entering into a phenomenon" (Clandinin, 1992), and by exploring it from "the inside" (Elbaz, 1991).

Narrative and story are increasingly used in research in education and elsewhere. Carter suggests that "stories became a way... of capturing the complexity, and interconnectedness of the phenomenon with which we deal" (1992, p. 7). This quality of story offers ways to give voice and describe the interconnectedness of teachers' thoughts and actions (Elbaz, 1991; Connelly & Clandinin, 1988). It is not that the story links thoughts and actions, "rather the story is the very stuff of teaching, the landscape within which we live as teachers and researchers, and within which the work of teachers can be seen as making sense" (Elbaz, 1991 p. 3). Thus, teachers' stories are a unity of both knowledge and actions. By living and telling their stories, teachers, in collaboration with researchers as colleagues, make those experiences public.

Data collection and analysis

My purpose was to explore "from the inside" the stories of the teachers who began to use computers for the first time personally and with their students. Prior to this study, I engaged in a preliminary study with a beginning teacher, Michelle. It was an important experience for me both in terms of entering the field of research, collecting data, and exploring narrative themes, and in terms of becoming closely aware of some of the issues involved in teachers' encounters with computers.

The two participants in this study, Bonnie and Kathy, are elementary school teachers. They teach in two different schools. Bonnie teaches year one-two and Kathy teaches year five. They are experienced as teachers but had no experience with computers until the school year of 1992-93. I worked with Bonnie and Kathy over a period of three months. During that time I spent two mornings a week in Bonnie's classroom, and an hour a week with Kathy in her school's computer lab. In addition to the observations in the computer lab, I also spent time in Kathy's "home" classroom on two occasions.

The data that were collected consisted of participant observations, field notes, teachers' stories told in taped conversations, and some classroom documents. I had weekly conversations with Bonnie and Kathy. Conversations were taped and shortly after were fully transcribed. Each conversation with Bonnie lasted from 25 to 30 minutes. Conversations with Kathy lasted for about an hour. These data are described as "field texts" by Clandinin and Connelly (in press). These are texts created by participants and researchers to represent aspects of field experiences. From the field texts, I developed an interpretive account through exploring narrative themes in each of the teachers' experiences. The narrative account constitutes my "research text" (Clandinin & Connelly, in press).

The pilot study

As part of my research, I conducted a preliminary study with Michelle, a year two, novice teacher who was using computers in her teaching. I worked with Michelle over a period of five weeks during which I observed her during computer classes in a computer lab. Computer classes were scheduled twice a week for 30 minutes each time. I also had three conversations with Michelle following some of the classes. Each conversation lasted for about 45 minutes. Prior to my observations in the computer lab, I spent one afternoon in Michelle's classroom. At that time I introduced myself to the students and had a conversation with them.

My work with Michelle was a valuable experience for me. It enabled me to engage in a relationship with a teacher as a participant in a research project. It gave me a first hand opportunity to enter "the field", the natural setting of research. This study also helped me explore means of collecting data as a participant observer, that is, taking field notes and engaging in sustained conversations. After collecting the "field texts" I wrote a narrative account of my work with Michelle organized around narrative themes. In many ways the pilot study helped me illuminate my quest into teachers' encounters with computers and focused my attention and my questions on the issue of first time encounters with computers by experienced teachers.

Different experiences

The ease with which Michelle made computers part of her personal and professional experiences and her view of computers as a natural phase in her life were very different from my own experience of encountering computers. While computers seemed "natural" to Michelle, they were anything but natural to me. Michelle viewed computers as an integral part of present day life. Moreover, she felt that using them improved our lives. Michelle did not develop a passion for computers but she enjoyed them because they were functional. Working with computers was a "safe" activity for Michelle. She was not intimidated by them and at no time did they appear to be a threat to her. As for myself, I felt that I had managed through life quite well without computers, and was not as convinced about making them a part of my life. Unlike Michelle, I had had a computer at home for several years which was extensively used by my son. However, I did not feel a need nor a desire to learn how to use it.

I decided to learn computers because I thought it was time for me to do so. I believed it would enhance my work as a teacher. I did not, however, anticipate what was involved in this experience and I was ill-prepared for it. Nothing in the learning experience I had in the computer course seemed to have been part of what Connelly and Clandinin (1988) refer to as "personal practical knowledge". My past experiences did not appear to be relevant to the situation I found myself in, that is, learning how to operate the computer. In the present I experienced detachment from, and resentment toward, the new medium. My future plans and actions were quite vague in relation to that situation. Hence, my first encounter with computers, "pulled out" very little from me. The different experiences Michelle and I had with computers accented for me the importance of studying experienced teachers who encounter computers for the first time.

Ethical considerations

An attempt to co-construct meaning with participants, that is, to take a view "from the inside", suggests developing a close relationship with the people and the situations that are being studied. "Understanding comes from trying to put oneself in the other person's shoes, from trying to discern how others think, act, and feel" (Patton 1990, p. 47). Thus, it was with great trepidation that I undertook my work as a researcher and the involvement it suggested in the participants' lives. Relationships were key to the research. "What is told, as well as the meaning of what is told, is shaped by the relationship: everything depends on it" (Clandinin & Connelly, in press). Therefore, I approached the research with the hope of developing relationships of mutual trust and respect with Kathy and

Bonnie. Such relationships apparently did develop over time. I feel that the trust enhanced a sense of value for the participants as teachers and persons and for myself as teacher, researcher and person (Huber, 1992). I understood my work to hold a tremendous responsibility for the research texts ultimately developed in my study.

From the initial stages of the study, I disclosed to the participants my purpose and methodology. The involvement of Kathy and Bonnie in the study was voluntary, and they were free to withdraw at any time. Anonymity was promised, but Kathy and Bonnie were also offered the opportunity to use their own names. Eventually they both decided to use their names in the thesis. Each step of the study was negotiated with the participants in order to prevent any imposition on their time and actions and to prevent any kind of manipulation. Our work together evolved through a gradual "negotiating" process. This on-going negotiation enabled us to develop relationships of mutual respect and understanding of each others' feelings and needs. After the completion of my narrative accounts of Kathy's and Bonnie's experiences, I brought the stories back to them. They each read their stories and responded to it over the phone. Bonnie also reflected about the experience of reading her story by writing a reflective account which I added, with her permission, to the study.

Since all the field texts in the study were provided by the teachers voluntarily, the experiences they shared with me pose no significant ethical risk to them. I hope that fidelity to Bonnie and Kathy from a perspective of an ethic of caring (Noddings, 1986), provided guidance to the direction of my study. It also enabled any knowledge gained through the study to promote the individual growth of each of us.

CHAPTER FOUR

Initiating The Research

In the summer of 1992, I began to look for two teachers who would be willing to participate in the research project. Being a foreigner in Canada, I had minimal contacts or access to schools and teachers. After I had exhausted my own limited resources, I approached some of my colleagues in the department in the hope that they might connect me with teachers who would be willing to participate in my study. This is how I came to know Bonnie and Kathy. It was later, during our work together, that I learned about the importance both Bonnie and Kathy placed on the part these individuals played in forming the connections between us. Bonnie and Kathy each trusted the individuals that mediated between us. This trust was invaluable in their decisions to participate in the study. It reaffirmed my view that a research begins and develops through trusting relationships. Their trust in the people that connected us amplified for me the responsibility I had to maintain the trust and extend it to my relationships with Kathy and Bonnie. Building trust was part of our work. It took ongoing negotiation and time.

Beginnings with Bonnie

I received Bonnie's name and phone number in the summer of 1992. The only information available to me at that time was that Bonnie was an experienced teacher who was about to begin to use computers in her class for the first time. I was delighted that a teacher was willing to participate in my research. I phoned Bonnie and described, in general terms, what I was interested in and how I wanted to conduct my research. Bonnie raised a concern about having only one computer in her classroom. She was not sure if it would suffice for my purpose. I said I would think about it and discuss it with my advisor.

When I contacted Bonnie again in mid-September, I told her that since having one computer is common to many classrooms, it seemed to be a rather natural situation for research. I told Bonnie that I would need about two to three months to collect data and we would need to engage in conversations during that time. I also suggested exchanging journals. Bonnie asked if short entries would do because she was pressed for time. This was my first encounter with the time issue which would play a crucial role in things to come. Bonnie asked if I was just going to be observing and taking notes in the classroom. I said that usually when I was in a classroom I wanted to be involved in class activities. Bonnie said she would be happy to participate in the study. I sensed that Bonnie was quite keen on having someone to help with her plans to start to work with computers in her class. I was looking forward to beginning our work.

We met for the first time in mid-October. We sat in the staff room, where I had set up the tape-recorder and we had a good conversation for about half an hour. To my dismay I found out later that day that the tape-recorder failed to record our conversation. I tried to reconstruct as much as possible of our talk. It was a reminder about the sensitivity of using a tape-recorder. I promised myself to be extra cautious in the conversations to come.

In my first visit to Bonnie's year one-two class, Bonnie gave a demonstration on the computer to a group of her students. On the second visit to the class, I found myself demonstrating and working with individual students on the computer. It was an enjoyable experience helping young children with their first steps on the computer. However, it was not what I had anticipated when I planned the research. I felt I was in an awkward position. There I was, trying to conduct research on observing a teacher beginning to teach with a computer, and I could not proceed with the original plans. Moreover, not only was it almost impossible for me to observe Bonnie, it seemed she also had very little time to talk with me after classes. One on one conversations were very important to me. I had planned them to be a major part of my study. Bonnie always seemed very busy and short of time. I became dispirited and alarmed. This was not the way I envisioned the research to develop. I had hoped for a close relationship; this seemed more like a non-relationship. I had hoped that both of us would be enthusiastic about working together. It turned out to be a time of great concern, uneasiness and tension for me and, I sensed, for Bonnie too. I felt inadequate both as a researcher and a person.

It was about two weeks into the research that I decided to talk with Bonnie about the way I felt. At recess time, I asked her if she could spare some time to talk to me. Bonnie said she had a few minutes. I asked Bonnie how she felt so far and she answered that she felt fine. She thought that computer time was going well and the students were experiencing success. However, it was not the computer or the students' interaction with it that were on my mind at that time. I was concerned about my original plan for the research that did not seem to be working. I was worried since I was the one working with the students on the computer most of the time. I was unable to observe Bonnie teaching with the computer. I wondered about not being able to share sufficient time with Bonnie after classes for in-depth conversations. Obviously Bonnie could not have guessed what was on my mind. I gave no clue of my concerns when I asked how she felt. Bonnie answered according to her interpretation of my question. I told Bonnie how I felt and described my uneasiness and concern, adding that I may be imposing too much on her time and schedule. I said I felt it was my fault for not making myself clear enough initially about what was involved in the research project. I told Bonnie that I appreciated her work and added that the last thing I wanted to do was to infringe on her work plans, or to impose my own agenda on her agenda. I also mentioned that I had hoped we would have more time for conversations and that I expected I would be able to spend more time observing her work with the computer. Bonnie sat quietly and listened. I went on to suggest that if she felt that my plans interfered in any way with what she had in mind, it would be quite all right with me if she chose to withdraw from the research. At that, Bonnie blushed and she said: "I'm not a quitter". It pained me when I heard her reaction. It seemed to me that Bonnie interpreted my words as suggesting that she had done something wrong, or was inadequate in some way.

Bonnie's reaction awakened me to reconsider what had happened and to take a different angle in examining my original plans. I suggested that we would think about the concerns that came up in our conversation and that we would discuss them again during the following week. It had been a week of soul searching for me. I later learned it was the same for Bonnie.

As I reflected on the process, I realized how closely the life of a researcher and a participant touch. Yet we both entered the research process with so little knowledge and awareness of each other's life stories and life situations. Preparing for the research I had read about the sensitivity involved in a research relationships. I was also participating in a group that met on a weekly basis to discuss research issues. But it was not until I actually crossed the line between reading and talking about research to actually experiencing it, that I could fully realize its complexity, the intimacy of relationships required of both participant and researcher, and the dynamics involving human beings in a real life situation.

It was naiveté on my part to assume that what appeared to me to be clear and well thought out was the same for Bonnie. It reminded me that research in education had been taking this perception for granted for a long time and researchers were used to viewing schools and teachers as convenient, never-ending testing grounds for their ideas. Researchers had been granted, almost automatically, free access to classes and schools. Many times they failed to share their plans and intentions with the teachers. I thought I had no part in this kind of research. I entered the research viewing myself as a teacher who was interested in other teachers' experiences with computers. Obviously I was initially perceived by Bonnie only as a researcher. Apparently I was re-living the same old story. I tried to imagine what Bonnie must have felt for the first few weeks. Did she feel her privacy was invaded by a total stranger? What did she actually know about my research? Was she suspicious of my intentions? I felt she had the right to be since she obviously had not understood my research plans despite what I saw as a clear outline.

As I was reflecting and trying to understand what had happened, it became apparent to me that describing the research process, or even having the participant read the proposal, did not automatically assure common understanding. A trust relationship and a better understanding needs cultivation over time by both partners in the research. I decided to share with Bonnie more of what I thought I had failed to share with her when I initially introduced the research ideas. At the same time, I tried to be more aware of personal needs and constraints that might arise through our work together.

The following week when we met again I gave Bonnie a more detailed description of the study. I particularly emphasized the importance I saw in being able to observe her in teaching computers, and of having time to talk after classes. Bonnie asked if half an hour a week would be sufficient for us to talk, adding that this was all the time she could spare. She had a young son and her first priority was to spend as much time as possible with him. Bonnie made me realize that when we first talked I was not clear and specific enough about the time involved in the research: "Certainly when we first talked I had no concept of the time you needed" (Con., Nov. 12, 1992). I also became aware of Bonnie's time constraints as a mother of a young child. The time spent with her son was a high priority to her. It was the reason she chose to work part-time.

This conversation marked a new beginning in our relationship, and opened a new page in the story of the research project. It was then that I felt I was becoming part of Bonnie's class. Bonnie included me in many of her class activities. She introduced me to her friends in the staff room. Later on she asked me if I was willing to share with her students some stories about my country - Israel. I was delighted to do so. Come Hanukah, Bonnie initiated a Hanukah morning celebration in which I shared the story of the Holiday with the children and together we prepared the traditional potato pancakes. No longer was I in Bonnie's eyes only the researcher with a notebook in her hand and a tape-recorder ready for use. I shared a slice of time, place, events and stories with Bonnie and 24 year one-two children. I had become a member of that small community.

About two months later, I told Bonnie I thought that the story of our initial experiences in entering the research situation was extremely important to me as a researcher and a person. We both reflected on that period. At this time I felt Bonnie was much more comfortable in sharing with me her feelings and thoughts about the first two weeks of our work together. When Bonnie reflected on the beginning of our work, she felt that "time" was her main concern. Bonnie described the management of time in her life as of great importance. Time was managed with great care by her. Bonnie said that for busy people, and she viewed herself to be one, it was essential to control time and use it wisely. When she talked about our work in the first two weeks she described it as being a stressful period in her life.

> I felt I was pressured with time in my life at that point, just because of other teaching pressures, the pressures of reporting, assessing, preparing for one-on-one conferences. It really was bad timing for me. (Con., Jan. 14, 1993)

For Bonnie it was a period in which a large number of issues that were under her responsibility and care needed her attention. When we started working together in late October, she was coaching a student teacher in her classroom. She was also in the midst of organizing a group of school volunteers. Bonnie said, "the demands on my time were just frustrating". She felt it was more than she could handle. It became a source of tension for her that turned into anger. "I really was rebelling. I was very, very angry about the demands on my time" (Con., Jan. 14, 1993). Bonnie recalled that in our first conversation I had indicated that our work together would require time. However, her interpretation of the concept of "time" was entirely different from mine. She did not anticipate having to spend extra time with me after school hours. And since her time was so carefully planned she felt imposed on, and anxious, when she realized that our work was going to extend beyond her planned schedule. Bonnie said she was glad I brought the issue up in November because "then we could come up to a compromise." It was both "time" and "timing" that needed to be re-evaluated by us before we could proceed with our work.

In January when we reflected on those first two weeks, I mentioned to Bonnie one more issue that seemed to have colored our initial understanding of our work. It was our different interpretation of the concept "research". As far as I was concerned, my research was mostly planned around observing Bonnie teach with computers in the class and holding conversations afterwards. I hoped my work with Bonnie would follow this original plan quite smoothly. Bonnie said that when I described to her my plans for the research she had her students' interests in mind, assuming that my presence in her class would help them with acquiring computer skills. We both realized quite early in the research process that we held a different understanding about what the "research" would entail.

> You see, you have got in your mind, as a researcher, what you want to do and you are right, it has to be extremely thought out, which I know you had thought it out, but you cannot predict ahead of time everything that you are going to encounter when you go into that room. (Con., Jan. 14, 1993)

Since I first started to work with Bonnie I remember using one particular phrase quite often, that is, "I need to talk to you." At times it sounded to me more like a plea. When I first came into Bonnie's class I observed actions, events, and the setting. I was anxious to talk to Bonnie about what I saw and heard. I wanted to hear how she thought and felt with regard to her first experiences with the computer. Bonnie listened to my requests for "talks" and was quite puzzled. The more I repeated those requests, the less comfortable she became. She commented later that all along she thought that we were talking all the time, and she wondered,

> You would say to me I need to talk to you, I need to talk to you, and I kept thinking we are talking as we were working ... and I thought that was probably enough, I didn't realize you actually needed to interview me. (Con., Jan. 14, 1993)

We both learned as we went along. We both made some concessions, at the time, which enabled us to work together with a much better understanding of our needs and our possibilities.

Beginnings with Kathy

When the school year began in September of 1992, and I still had not found a second teacher to participate in my research, I became troubled. Time was a very important consideration to me since I had to complete my thesis by the following summer. Thus, my search for a second teacher who would participate in my research turned into an urgent endeavor. Once again, with the help of a colleague from the university, I received a name and a phone number. Once again I knew very little about the person behind the name Kathy. I contacted Kathy in the beginning of October and re-lived the excitement I had lived with Bonnie. Kathy said she was willing to meet with me. We met in mid-October in Kathy's school. The day I drove to the Kathy's school was also the day I was to meet Bonnie for the first time. It was a beautiful fall day. I hardly noticed the scenery or the bright blue sky. I was curious and excited but mainly I was consumed by two troubling questions: What is it that I can offer Kathy and Bonnie? Why should they be interested in sharing their experiences with me?

I arrived at Kathy's school, found my way around, and met Kathy. She seemed excited too. We introduced ourselves and talked for a while. It was then I realized Kathy was bothered with the same thought but from her point of view. She wondered what she was doing or saying that could possibly be worth researching? I realized that it was not uncommon for teachers to feel that way. Kathy expressed a sense of humility as a human being, but also wondered as a teacher, whether her work was a worthy issue for research. I started to describe the research project. Kathy did not ask many questions. I brought my proposal and showed it to her suggesting she should read it. Kathy flipped through it. It appeared to me as if she was eager to go ahead and start to work. To my disappointment, before we started our conversation, I realized the tape-recorder was not working. I decided to take notes while we talked, hoping to capture as much as possible of the conversation. When I arrived at Kathy's school, I knew I had Kathy's initial consent to meet with me. However, I was not really sure about Kathy's actual agreement to participate in the research since prior to our meeting we had talked only once for a brief time. When we started to talk, Kathy mentioned that she had already agreed to participate in the research, through our mutual acquaintance that had made the contact between us. I was delighted to hear that. As for myself, I did not perceive this initial connection, and the few sentences we exchanged over the phone to be a "formal" consent. But, once more, I realized that the meaning each of us made was in the mind of the beholder. I assumed Kathy needed a meeting to clarify more details and to consider further the idea of participation in the study. Kathy assumed she had already granted her agreement and that we were about to proceed with the research itself.

Three months later, on our last taped conversation, I reminded Kathy of our first meeting and I wondered, this time overtly, about her consent to participate in a research with a total stranger before she talked and met with me. Kathy explained that her willingness to participate was greatly influenced by the person who made the contact between us. Since she respected and trusted that person, she felt it was going to be a worthwhile experience. Notwithstanding her trust in the friend that connected us, I still thought she was quite brave in consenting. Kathy dismissed the term "brave". She said:

> Not really that brave, because if it started off well and then it started to go badly, and it started to become a stressful situation, then I would have said I can't do this anymore, I can't continue ... I never think of anything as being absolute. (Con., Jan 6, 1993)

It seemed to me that Kathy was in some way taking a risk, accepting me and my research with very little questioning, with no hesitation, and with no overt reservations. I shared these observations with Kathy suggesting that she was a risk taker. Kathy said that she was not aware of this aspect in herself. "I guess I just don't. If that is a strength of mine I don't recognize it as one ... you know I don't see it in myself" (Con., Jan. 6, 1993). Kathy trusted the friend that introduced us as well as her own judgment and ability to sense, as we would proceed, if the situation would at any point turn into a negative experience. She felt she would be able to react accordingly.

Kathy remembered having some concerns at the beginning of our work together. One of them was a concern about feeling exposed:

> You see, before I met you I thought too that you are kind of a computer expert, so I'm thinking someone is coming in and they know, and they are going to wonder how it is that I could have gotten through 33 years of life and not know how to turn on a computer. (Con., Jan. 6, 1993)

Another concern Kathy mentioned was being evaluated: "you worry a little bit about that too, that you are going to be evaluated or judged" (Con., Jan 6, 1993). The use of the term "a little bit" was interesting and seemed to be in accordance with Kathy's manner of dealing with situations. Although she mentioned few initial concerns, they were marginal in her eyes. In no way did they seem to be a major threat, or a cause for anxiety. Kathy admitted that "I didn't really have any sort of preconceived notion as to what would be involved" (Con., Jan. 6, 1993), yet she asked me very little in our first meeting. When I wondered about it she said, "I guess it's just part of my personality, I just kind of take things as they come" (Con., Jan 6, 1993). It appeared to be part of her attitude that nothing was final or absolute, and that there were always alternatives that she could turn to. "What is the worst thing that could possibly happen? ... I'm sure you can still turn that around to your own advantage" (Con., Jan, 6, 1993). Moreover, she said that I had told her at the beginning that she was free to withdraw at any point. She added that even if I wouldn't have mentioned that, she would have opted out, had she thought that our work was not going well for her, "I didn't think my whole reputation as a teacher would be on the line" (Con., Jan 6, 1993). Within the first day of our work, Kathy realized that I was a novice with computers too. Kathy was relieved. She shed the slight apprehension she had about being judged by me, and made me feel as if we were in the computer experience together.

As my work with Kathy and Bonnie proceeded I had come to realize to what extent interpretations of concepts, events, and situations were shaping the research. I became further aware of how concepts, even ones we use daily, do not hold identical meanings for different people. This is magnified given different circumstances. In my work with Bonnie, the concepts "time", "research", and "talk" were colored by the different contexts we were "dwelling in" (Polanyi, 1958; Polanyi & Prosch, 1975). The narratives of the three of us were composed by unique sequences of events, happenings, and people. During the period in which we worked together Bonnie, Kathy and I were like three characters in a story situation into which we each brought our own implicit values, agendas, priorities, and life histories. To a certain extent each of us "crossed the line of familiarity" (Richert, 1993) to enter settings and situations that were different from the ones we were familiar with and immersed in at the time. We needed to think and learn how to live our new stories so they could be in accord with our values, interests and priorities and at the same time would not cast a shadow or replace the other stories being lived. I feel we gained new insight through the process of "in-dwelling", a process that connected our thoughts and actions into meaningful experiences.

As my work with Kathy and Bonnie proceeded past the first few weeks, I actually re-entered the research process with what I believed was a new and better understanding. From that point on, throughout the time we spent together, and even now while writing about it, I never ceased to consider the moral aspect of being a researcher. I recall Noddings' (1986) notion of the "ethic of caring" through which she envisioned teachers' practices. In the spirit of her view which suggests that at the heart of teaching lies the concern for the persons we teach, I continuously tried to imagine the effect my work would have on the lives of Kathy and Bonnie. I believe the moral aspect to be crucial not only when entering the research but throughout the process. I also found my personal practical knowledge to be a most valuable source in helping me find my own path in my journey as a researcher. My ways of knowing school culture, classroom situations, teachers' and students' special rhythms, supported me in becoming more aware of Bonnie's and Kathy's needs. I was constantly trying to imagine myself in their positions. I was fully aware that we had to alter some of our initial plans but in so doing we experienced a much better knowing and understanding. When Bonnie said "I know exactly where you are coming from now" I felt that we had bridged the initial gap that existed.

When Kathy and Bonnie opened their doors and invited me into their classrooms, I knew I was about to become part of the lives of two teachers and their students. After the first few weeks I came to understand that opening the doors was just a beginning. I had to earn my right to become part of their lives day in and day out. As the research proceeded, I continuously tried to stay aware and alert so as not to overstep the faith and trust I was granted by Bonnie and Kathy. With time, we felt that the space and time we shared became safe for us. I believe that it is only in a safe place that stories and, in particular, research stories get to be told to their fullest. I also hope that Kathy's and Bonnie's stories are told as close as possible from the "inside".

CHAPTER FIVE

Kathy

Kathy describes herself as an experienced teacher who has taught elementary school for 10 years. She is enthusiastic, loves teaching, and loves children. Yet Kathy admits that becoming a teacher was not her life-long dream. It was not her choice to become one. It was her father's recommendation which she accepted without question. Kathy laughed when I asked her how she became a teacher and said:

> Do you really want to know? ... I find it quite funny that my dad suggested that I go into teaching ... and that's how I became a teacher, my dad once, over the table, said why don't you? ... o.k. sure why not? ... I wish I would have had one of those special stories. (Con., Jan. 13, 1993)

She was reminded of an event that took place when she was a grade 12 student. Over the dinner table, Kathy informed her family that she would like to take a year off schooling to travel. Her father, from a poor immigrant family in which four of the five children graduated from university, was not prepared to have her stray from the family tradition. He said that in his family every one attended university. Kathy reacted by saying she was not sure what she wanted to study. Her father said that since she was always good with little kids she ought to go into teaching. Kathy thought it sounded reasonable, accepted his suggestion and enrolled in the Faculty of Education. In retrospect, she said, given that her strength was always math and science and that she excelled in them, she was certain, had it been one of her brothers, her father would have asked him to consider going into science or engineering. But since her father was conservative in his views he probably acted upon the convention concerning woman, and suggested she enter teaching. Since Kathy was not yet 18 years old and described herself as "immature", she did not question her father's choice for her. His choice became her profession. Kathy reflected on the incident that directed her toward teaching with a sense of amusement. That unplanned path had turned into a most positive and rewarding experience for her. She never regretted becoming a teacher.

When Kathy began teaching 10 years ago she taught in an inner-city school. It was her choice to teach in that environment. Now Kathy teaches in a large school in a middle class neighborhood. She joined the school five years ago with a class of year 1-2 students. In October a year later she went on maternity leave, and then held a part-time position for two years during which time she had two children. Last year she went back to teaching full-time. Kathy is currently teaching a year 5 class housed in a school's portable.

Kathy's school

Nested in a fairly new residential area, Kathy's school is a modern looking cluster of buildings with ivory colored brick walls. The roof tops, painted in bright red, have a unique appearance. They are shaped like triangles which seem to be tilted toward one side. The main entrance to the building is very wide and consists of a number of large glass doors. One may get a glimpse of the school interior even before actually entering the school. In front of the school there is another modern structure, a large clock set on a red high metal post shaped like an inverted letter "U". Closer to the side-walk, there is a line of young trees. Two portables, which appear to be a recent additions to the school, are situated on the right side of the school's main building. One of the portables is attached to the main building, the other one is placed further away. Unlike the main building, the portables have no distinct architectural features. They are covered with yellow metal siding and have red metal doors. At the entrance to the main building, there is a large open space which serves as the school library. Numerous book shelves are placed around it. This spacious area always seemed full of activities: students working around the tables; students browsing for books and other materials; and, during recess, teachers gathering for planning or conferencing. This space is surrounded by the office, the staff room, and some classrooms. More classrooms are found at the far end of the open space and in two wings of the building. All are connected by hallways. The walls in the hallways are covered with students' work and with informative messages. The school appeared to me to be a dynamic, inviting place.

Although most of my research observations took place in the computer lab, the classroom was Kathy's and her students' main environment. The classroom space framed their shared time and experiences. It was also the setting where Kathy and I had most of our conversations. To provide readers with a glimpse into this setting, I now describe Kathy's classroom.

Kathy's classroom setting

To enter the classroom, I walked over a wooden boardwalk which led to a long and rather plain looking portable. During the winter the boardwalk became quite slippery, a joy for skating lovers, a hazard for others. The entrance, through a red metal door, was located at the back of the portable, beyond the students' desks. Seating arrangements varied. Sometimes students were paired, other times they were grouped in various ways according to activities. In front, above the blackboard, class rules were displayed: respect, responsibility, self control. There were also some thoughts about friendship. Large windows were the main feature of the wall on the left. On the upper part of that wall, above the windows, students' portraits were displayed, hand drawn by each student. On the lower part of that wall, there were book shelves. The right wall was mostly dedicated to displaying math, and students' art work. When I first arrived in October, art displays focused on phantoms. Toward the back of the portable, behind the students' desks, stood a mobile divider with students' reading logs posted on it. Near the divider there was a game center which consisted of a round table covered with group games always in progress. The room was bright due to the large windows. The word "informality" best described the classroom, both in its layout and in its atmosphere. I had a feeling of ease and comfort in the room.

Having a portable for a classroom meant staying physically distant from the main school building. At times this distance caused both Kathy and her students a sense of detachment from the school's life. To participate in school activities and to use school facilities such as the library, the gym, and the computer lab, meant for Kathy's students, putting on coats, mittens and boots to walk over to the main school building. Once there, they needed to peel off all the external garments before they could join the activities.

"Sitting on the fence"

When Kathy and I first met I realized she has been working for 5 years in a school which had a computer lab. I wondered why she still considered herself to be a beginner with computers. Kathy explained that when she first joined the school staff she taught a year 1-2 class and for that age group computers were optional. Kathy chose to ignore that option. "I was glad my class had nothing to do with the computers" (Con., Nov. 18, 1992). For the two years that followed, Kathy was on maternity leave and taught part-time. The computer hour was taught by her team partners. A year ago when Kathy got a year 4 class, she found her schedule included a weekly hour of computer lab. Kathy went with her students into the computer lab each week. Her students used the computers mainly to play games. She described the computer time: "When I went in with them it was just ... *they* played *their* games, *they* turned them on, *they* turned them off "(Con., Nov. 18, 1992).

For Kathy, however, it was a different experience. Kathy described the class of 12 students she had last year.

> I had really a difficult class and the kind of class where some days you just want to make sure your head stays above water, because there was so much going on and it was very draining. (Con., Dec. 2, 1992)

There were children with numerous behavioral problems and she worked very hard in the classroom to control those children:

> I felt very justified in saying I can't handle one more thing this year. And I think I'm pretty good in deciding what I can and can't handle ... I could argue and say it was an excuse but it was also true. I did have a lot that I was working with and no, it wasn't important, I opted out of that. (Con., Dec. 2, 1992)

Kathy's students loved to play computer games. For Kathy and her students, that hour each week served as a haven.

> I had a really difficult class last year and it was great to have a machine per student, so they didn't fight with anybody. Last year they had to have at least, I'd say, half a meter around them, because if somebody bumped into something there was a fight right away. (Con. Oct. 21, 1992)

Kathy found that the change of setting and the students' individual interactions with computers affected them in a positive way. Her students had experience from previous years. They knew how to turn on the machines, and how to insert and operate different games. Kathy did not need to acquire even minimal computer skills that year. For Kathy and her students, this hour a week of computer lab was an hour of peace and quiet. Toward the end of the year, Kathy wanted her students to use the computers for some writing. She asked the school librarian to teach her students how to use the writing program. Kathy also took advantage of the fact that her lab class was scheduled after the year 6 class. She asked a few year 6 students to stay on in order to "boot up" the computers for her students, to save and to print their work. Those year 6 students appeared to be the scaffolding Kathy needed to deal with computers at that time and under those circumstances. Kathy said she stayed totally uninvolved and added, "I think that when you don't want to learn something, you get very good at compensating" (Con., Oct. 21, 1992). Computers remained "mentally invisible" to Kathy. She had no need or desire to use them herself.

Kathy's attitude towards computers did not appear rooted in her background. Kathy described growing up around computers in her teen years. Her father, an electrical engineer, was an enthusiastic user and advocate for computers. As soon as personal computers were available he bought one and upgraded it every so often. Later, computers became part of her brothers' and sisters' lives too. Kathy said all of them tried to interest her in computers in numerous ways using a variety of "tricks". But Kathy showed no interest in computers. Kathy loved to read and loved to do math and science. Computers did not appeal to her. She felt no need for them. She saw no value in them and had no room for them in her life at that time. When I wondered if machines in general intimidated her, she said she didn't think they did because she always used machines when she needed them. Kathy said that even though she was not inclined toward technology, she was encouraged by her father to figure things out on her own when a need arose.

> I have been really good at just pushing buttons, and so I just pushed things ... and whatever I wanted to happen - happened ... like with TV., O.K., you fiddle with buttons. I would just play with the buttons in the back and pretty soon I'll get a good picture, and so I would be able to fix it. (Con., Nov. 18, 1992)

She described a similar experience with the V.C.R. (Video Cassette Recorder):

> If the V.C.R. isn't working, I can check all the connections... so I check everything, fiddle around, look at buttons, see if it makes sense. (Con., Nov. 18, 1992)

Kathy learned to use machines and to make them part of her life according to her needs.

Until this year, Kathy had not made a commitment to learn to teach with computers. She had no room for computers in her work as a teacher. Everything she did seemed more important and relevant, and thus, no room was left for incorporating computers into her teaching. To Kathy reading, spending time with books, writing, math, and conferencing with children took precedence over computers. She felt that if she had extra time "I want them to be reading, or working on problem solving in math. Things that are going to develop their minds, and I don't think computers develop their minds" (Con., Dec. 2, 1992). Kathy did not feel that she or her students were missing anything of importance. She remembered a book she had read some years ago called "Insult to Intelligence" by Frank Smith. The book questioned the value of computers in school suggesting that they did not promote critical thinking. Kathy wondered, "Maybe that's the part that stayed with me" (Con., Dec. 2, 1992). She remembered she wanted to tell the author, "Frank, you have got a point there." Since students' best interests always guided her decisions, Kathy did not see how their best interests could have been served by computers. Consequently, when using computers was an option Kathy opted out, feeling that there was so much to be done in the classroom without computers.

The leap

Some of the things that kept Kathy away from computers became some of the reasons for bringing her closer to them this year. It was mainly having the students' best interests in mind, their needs, her needs, and the "right" timing. Kathy's program had an hour a week assigned to computer lab. It was an external factor that Kathy, who had described herself as avoiding computers, could no longer disregard. Although an hour of computer lab had also been scheduled into her program last year, Kathy was mindful as to the different situation this year as opposed to the previous year. Now she was teaching a year 5 class and, considering that they had previous experience in the computer lab, Kathy thought it was only fair to them to have them continue the computer agenda.

> I wouldn't want to be the one that withholds something from them, and I certainly couldn't do it on the basis that I'm not comfortable with that (computers), because that's not fair either. (Con., Oct. 28, 1992)

As part of her philosophy of education Kathy was continuously reaching out for anything that might hold value for her students. Her decision to begin to use computers was part of this philosophy.

> You are hoping that you are going to be able to find even one little thing that you can use that will make your classroom a better place for the kids. So I think you have to be open minded because you are bound to find something that is going to work. (Con., Nov. 18, 1992)

Having her students' interests in mind accented Kathy's need to learn to use and to teach computers. However, having made the decision to "get off the fence", Kathy still was doubtful as to the value and place of computers in her teaching.

Until Kathy made that choice she described herself with regard to computers as "sitting on the fence", "resisting", and "avoiding them". Kathy remembered she used to see messages posted on the staff room board offering in-service sessions in computers. She ignored those messages for a long time. Still, one day she signed up for one of the scheduled sessions. Kathy never attended that session. However, by signing up, she felt she acknowledged she had a problem or a need. She said that at that moment when she first placed her name on the chart she joined what she coined "C. A." - Computer Anonymous".

In the fall of 1992, Kathy decided to learn how to use a computer and how to teach with computers. She chose to become computer literate. Kathy pointed out that her choice to incorporate computers into her teaching made all the difference.

> Before you actively make that choice to do it, everything you say to yourself reinforces that you don't want to be (computer literate). So then you make that choice and then you kind of go into it. (Con., Oct. 21, 1992)

The computer setting

I came to know Kathy mainly through our experiences in the computer lab. Her weekly schedule included one hour of computer lab. This was the main setting for our work together over a period of about three months. Once a week, on Wednesday, I joined Kathy and her students for an hour in the computer room. This hour was the time between morning recess and lunch break. Kathy and I would then use the lunch break to engage in conversations in her portable.

The computer lab was situated in the main building, next to the gymnasium. The lab was a medium sized room with a floor covered mostly by a brown rug. The center part of the room held 15 Apple GS computers grouped in fours and connected to 4 printers. On the left side of the room there was a low cabinet with storage drawers. Above that cabinet there was a model of a computer key board with egg containers for each letter. On the left hand side there were a number of metal shelves which accommodated boxes of different computer programs. Most of the other part of the wall was taken up by a file cabinet and more shelves that were used for storing paper. The upper part of the wall was covered with a variety of computer pictures made by students. The right wall displayed a large chart that read: "Three cheers for computers". Posted above was another collection of colored pictures made by students who had used a special computer program to produce them. This room evoked different feelings for me than did Kathy's classroom. It was a cold and impersonal setting .

"The blind leading the blind"

The fourth week in October, 1992 marked a new beginning for Kathy. She was about to give her first lesson in computers. Kathy and I met in the staff room and walked into the computer lab. We had about 15 minutes before her first computer class began. We sat and began talking. At first, I did not intend to record the conversation but after a few minutes had passed, I felt we shared some special moments of beginnings and I wanted to capture them as accurately as possible. I realized Kathy was quite relaxed and I asked her permission to record our conversation.

In the brief time we spent together before the class, Kathy was concurrently telling, asking, answering, wondering, hoping, and, in between, laughing.

> I would be showing them how to get into the tutorial part, oh I love this big language - the tutorial part - all you have to do is push the escape button I guess ... It's our first experience with it, the next time, if we get far enough through it, I would think that we will start writing a little bit, but I'm not even sure ... I expect that I'll be sitting down with them today and doing it with them... I hope it works ... . (Con., Oct. 21, 1992)

In some ways, that morning, we were both beginners: Kathy was about to begin teaching with computers and I was about to begin observing and documenting these experiences. I felt as a beginner, since it was only my second experience as a participant observer outside the university setting. It was not until some weeks later that I realized that my beginning too, needed much thought and attention.

Kathy talked freely. She talked about her plans for the coming hour and informed me about the new program she was about to introduce to her students, a writing and publishing program named "Bank Street 3". Kathy's goal for the upcoming two to three months was to teach her students the writing program and later to have them become self-sufficient enough with that program so they would be able to work independently on publishing their own stories. After outlining her goals with the computer program, Kathy talked mainly about her thoughts and feelings. She was worried because she was not totally confident in what she was about to demonstrate. That particular program was recommended to her by a colleague, the school computer coordinator. Kathy consulted her when she decided to teach computers. This was the same person who had initiated Kathy into operating the computer and learning to use the "Bank Street 3" program. Kathy had only participated in one in-service session with a colleague and she had not yet had a chance to review the whole program. With what I came to recognize as her special sense of humor, she described herself as "the blind leading the blind" (Con., Oct. 21, 1992).

Kathy knew her students had previous experience with a variety of programs. But she also knew that, with the exception of one student, it was their first experience with the "Bank Street 3" writing and publishing program. Kathy said she wanted her students to know that :

> A student in the class could be an expert on a program or on computers where I am not and that they could help me because I can learn as much from them as they can learn from me. (Con., Oct. 21, 1992)

Kathy mentioned two students, Sam and Jack, as far more proficient with computers than the rest of the students. Sam, in particular, whose father was a professor in the university in computer engineering, had a strong background in computers. Kathy discussed the possibility of having Sam act as their computer "expert" on the program and in general during lab time. Still because he was a student in the class, Kathy said, "I would expect that ... he is responsible for doing the same thing that we are doing ... and if there are any 'glitches' I'll ask the kids to call on him" (Con., Oct. 21, 1992).

Kathy believed that students and teachers are all engaged in teaching and learning. In beginning to teach computers, she was not concerned about "damaging" her reputation as a teacher. She did not fear for her image of "teacher as expert". Kathy did feel more exposed and vulnerable in the computer lab than in other situations in the classroom because of her minimal experience with computers.

Kathy was unsure about what she was going to do. "I really don't know what I'm doing. Usually I know what I'm doing but it's a new concept this time and I don't know what I'm doing" (Con., Oct. 21, 1992). She described openly the way she felt. She said that my presence obviously added pressure to the new situation. "I get nervous and I think even more so because then you think someone is watching how I'm going to do" (Con., Oct. 21, 1992). When I asked her if she wanted to practice before class, she said she did not intend to because she wanted to proceed with the lesson in the same way she would have done it had I not been observing her. Yet, she said, she came in early that morning to make sure that the program she was about to use was in the lab.

Kathy also expressed concern about the way the computers would function.

> You know, you start worrying, it's a machine and I can just see it ... I've got a whole hour planned for this program, and that is what will happen, it will spit out at me or something, like it will keep coming out of that little box, you know how that happens. (Con., Oct. 21, 1992)

It was noticeable that Kathy felt somewhat unsafe in a place where, rather than depending on herself for her teaching, she was depending on machines. Rather then being involved in human relationships as she was accustomed, she and her students would be involved in communicating with machines. Kathy wanted her lesson to go smoothly because she did not want to waste her students' time with malfunctioning machines. Yet, she knew that being inexperienced, she had very little control over that matter. "So I think it's just an added worry because I'm not comfortable with the machines. It's just an added worry I guess" (Con., Oct. 21, 1992). While Kathy was candidly expressing some of her concerns, she did point toward a positive aspect of her inexperience with computers. She thought it would help her empathize with her students who might experience difficulties with the new program or with other activities in the lab. "I think I can understand better if the kids get stuck, what they mean, because I have been there" (Con., Oct. 21, 1992). Fifteen minutes before Kathy's first computer class there was excitement in the air. It was the kind of excitement that inspires an experience rather then limits it.

When recess was over, Kathy asked me to wait in the lab while she went over to the portable to bring the students into the computer lab. The students came in to the school lined up, and took their boots and coats off in the hallway. I observed them as they shed their winter clothes, wondering whether they were also shedding their sense of belonging to another environment. But the physical distance between their home classroom and the main school did not only evoke a sense of detachment, it was also an inconvenience that sometimes deterred both Kathy and the students from fully enjoying the school's facilities.

After the students entered the lab, Kathy sat by one of the computers and asked her students to gather around her. Some students sat on the rug, some kneeled and some remained standing. Kathy informed the students that she was about to demonstrate the use of the writing and publishing program named "Bank Street 3" and that they would be using it in the following months. She began by getting into the tutorial, and emphasized a number of terms that were central to the use of the program. Throughout the 12 minute demonstration, Kathy continuously looked around to make sure each child was able to see the screen. When the demonstration was over she asked "are you all clear?" They answered "yes". Kathy asked the students to pair up and work through the different stages of the program. She specifically directed them to read all instructions carefully, to follow them closely, and then she added in an assuring tone "even if you make a mistake, don't worry, the computer will tell you. Last week when I did it, it happened to me and the computer told me" (F. N., Oct. 21, 1992). Then Kathy turned to me and said, "this was easy!" There was a hint of triumph in her voice and a spark of humor in her eyes. It appeared to me that Kathy was announcing that she was no longer sitting on the fence. She had made her leap.

While the students were working through the program, we both circulated in the room, trying to help as much as we could where help was needed. Kathy swept the room with her eyes and chose to sit next to a pair of students that seemed to have a particular distance between them. She sensed they needed support to help them cooperate. They were the last to pair up after all the pairs were formed. They reluctantly paired up. Kathy was busy assisting different pairs of students through the whole period. I tried to be helpful too but soon realized that I could be of very little help since I was not familiar with the computers and that particular program. Most of the students went through the first 3 steps of the tutorial. Some students progressed to step 4. When they asked for help with that part of the program, Kathy was unable to provide it because she herself had not mastered that part of the program. She was very open to admitting that to the students and told them either to ask for the help of their "expert" student Sam, who had used the program before, or to be patient and to wait for answers in the coming week. The students seemed to accept her suggestions.

I observed Kathy during her presentation and through the rest of the computer class. Kathy appeared poised and almost relaxed. It would have been impossible to detect by her composure that it was her first experience in teaching computers. It seemed that Kathy achieved her goal for that class. All the students became familiar, to some extent, with the needed vocabulary for the "Bank Street 3" program. All of them practiced the tutorial program going through, at least, the first three stages.

Kathy's reflections on the first computer lesson

Following the lesson in the computer lab, we both walked toward Kathy's portable. It was lunch break and Kathy said we could talk all until afternoon classes began. Actually, Kathy started to reflect on the lesson even before we entered the portable. She seemed excited and eager to share her thoughts about her experience. Kathy's first comment was that she regretted not assembling the students in the library for the demonstration because the computer in the library had a tilting screen and so it would have been easier for the students to observe. A more pressing concern for Kathy was her inability to be with each child and to observe their progress. "I didn't get to circulate as much as I wanted ... so I'm thinking O.K. which kids are going to be able to go on to the next step?" (Con., Oct. 21, 1992). Keeping track of each student's progress was important to her and she was concerned that she was not able to keep track in the lab. Another point raised by Kathy was the reading component of the program. When she was circulating among the students she noticed that while following the different tutorial steps, students were required to read some lengthy paragraphs in order to proceed with the program. She realized that some of the students avoided reading and tried to guess at the instructions. Consequently, they ran into difficulties. Kathy commented that this avoidance of reading was quite characteristic of a number of the students. She said most of the students were looking for immediate gratification in their work. "I find as a group they don't persevere very much, like problem solving ... they look at it and if they can't, if it's not a fast fix, forget it" (Con., Oct. 21, 1992). Kathy decided that in the next computer class, in order to motivate the students, she would have them write something before completing all of the tutorial stages as she had first intended. She wanted them to experience a sense of accomplishment by producing their own written pieces. Still Kathy said she was not going to waive part of the program. She expected her students to complete all of the tutorial program.

As I reflected on our conversation, I noticed Kathy did not talk much about what should have been described as a successful lesson. It puzzled me. Why wasn't she expressing any feelings of accomplishment? It was her first lesson with computers and it appeared to me to be successful. Kathy's behavior in the lab did acknowledge such feelings. Yet, she did not pause to celebrate. As I reflected, it seemed to me that Kathy probably took for granted the part of the experience that went well. There was no point in celebrating the taken-for-granted. It appeared that rather than dwelling on what went well, Kathy was anxious to discuss what could have been done better or what should be considered for the future.

Kathy's first computer lesson was typical of coming lessons. A typical computer class began at 10:30. Kathy would leave the main building after recess to assemble and accompany the students from the portable into the main building. Most of the time I waited for them outside the computer lab in the hallway and joined the students as they entered the lab. The students would arrive walking in a line. They would stop for a moment until Kathy made sure they were quiet and ready to enter the room peacefully. Most of Kathy's computer classes followed a similar pattern to that first class. Variations took place according to need. Sometimes Kathy demonstrated specific parts of the program.

> After entering the computer lab Kathy told her students: "only the students that are ready to publish, raise your hands." She directed them by saying: "make sure you have a printer attached, and paper in it. I think I figured a way to print bigger letters. Could you gather around this computer?" The four students, who were ready to publish, gathered around and Kathy demonstrated the printing process. (F. N., Nov. 4, 1992)

At other times, students got instructions when they entered the lab and worked independently for most of the hour. Occasionally students were instructed to use specific math or spelling programs for a given time, usually 30 minutes, while the rest of the hour they were free to chose programs on their own according to their preferences.

A computer in the classroom

In one of our first conversations, Kathy asked me if I had any suggestions for her. At first I was surprised. I was not prepared to be asked for advice but then I remembered that, in many ways, we were in the experience together. I was glad Kathy felt comfortable enough to consult me. I asked Kathy if it was possible for her to get a computer for the classroom. She said that the school had a "mobile" computer that was available to all classes for a period of two months at a time. She said she needed to wait one more turn before she could get it. She said she would ask to see if it was possible to re-arrange the turns. About three weeks after I first began my observations, Kathy called me one night and said her class was about to receive the mobile computer. It was to be installed in her class the following day. Since I had told Kathy earlier that I would like to be present when the computer arrived, she informed me about its arrival. She wanted to make sure it would be a convenient time for me to come. We made arrangements for me to be there the following morning.

When I entered the classroom the following day, the students were engaged in quiet reading. Kathy was working with individual students on their reading. At about 9:40 we heard noise outside the class door. One of the students opened the door and started hopping around calling out, "We are getting a computer, we are getting a computer." In came three year 6 students carrying a computer and a trolley. All eyes followed the three boys while they walked in and started to set the computer up at the spot chosen by Kathy at the front of the classroom. There was a hiss of excitement in the air. It took the three students less then five minutes to complete their task. Immediately after they left, Kathy realized the computer had a different disk drive from the ones they were using in the lab. It could only accept the 5 1/4 inch disks, not the 3 1/2 inch disks they were using in the computer lab with their writing and publishing program. This was a set back. Kathy consulted her "expert" student about ways to deal with the problem. He said there was a way to transfer the program from one disk to the other. Kathy discussed with the students options for using the computer in the class. They made tentative suggestions for fairness in using the computer.

> Only one person on the computer at a time; if no one is using the computer one can go and use it; for the near future no use of computer during recess. Some students raised concerns about those students who were always quick to complete their assignments, they wondered about the fairness of using the computer. They didn't seem to solve that issue so they agreed to think about it some more and discuss it again. (F. N., Nov. 9, 1992)

Both Kathy and her students seemed excited with their "own private" computer in their classroom. Kathy hoped having a computer in the classroom would take the sting out of some of the pitfalls of having to use only the lab. She thought that no longer would the computers be perceived as a disconnected entity. No longer would she and the students be confined to a prescribed period of one hour a week in the computer lab. But disenchantment was soon to follow. A number of things seemed to interfere with Kathy's plans about their "own" computer. All of a sudden Kathy found herself having to deal with what she referred to as "an added headache" or an "added irritation" (F. N., Nov. 9, 1992). She was faced with a new unexpected situation in which she moved from no computers at all to dealing with three different areas of computer activities: the lab, the classroom, and the library settings. Kathy was troubled and unsure about how to handle these situations. When the students actually began using the classroom computer, they ran into technical problems such as the need to translate both the program and students' work from one size of disk to another each time it was taken to the lab to be printed. It also became quite clear that Kathy's priorities did not leave much room for computer activities. Kathy described the computer as "just sitting there" most of the time because, as she explained it, she found no time to use the computer in the classroom. By working on the computer, students missed other activities that were taking place at the same time. When she considered the other activities they were involved in, they always appeared to be more important than computer activities. Kathy was not ready to place work on the computer above other work.

Narrative themes in Kathy's experience

As part of the methodology for my study, I analyzed the data from my work with Kathy in order to identify narrative themes (Connelly & Clandinin, 1990). Four significant themes seemed apparent: "In the company of strangers", "improvisation", "humor", and "questioning the value of computers".

In the company of strangers

"I feel like a fish out of water in the computer room ... things that would come so naturally in the classroom - just don't "(Con., Dec 9, 1992). Kathy expressed feelings of alienation and frustration in the computer lab situation. Not only was the lab physically separated from her and the students' "home" environment, it was also mentally detached from her experiences in the classroom. In many ways the lab setting, the machines, and some of the events that occurred, evoked in Kathy a feeling of walking on alien territory and being among strangers. Kathy did not know the "residents" of that territory, nor was she familiar with "their" language. One of the first things Kathy encountered when she began using computers was that they required a different language, a language completely foreign to her. In any subject matter she taught in the classroom, Kathy used a variety of resources. She knew the appropriate language for each of these resources. When she was first faced with the computer manuals, she felt lost and illiterate. Trying to consult computer manuals reminded her of unreadable physicians' texts. Kathy needed a mediator to translate the computer language for her so that she would be able to connect with the new medium. For Kathy who was accustomed to being independent in most activities in which she was engaged, it was a new, different and sometimes frightening experience.

The feeling of alienation was further accented by the need to deal with 19 unfamiliar machines. Kathy knew very little about their operation and maintenance. A room full of computers and printers was not the milieu Kathy was accustomed to. Thus, it turned out to be an unsafe place for Kathy and sometimes for the students too. It was not so much that she feared for the safety of the machines; rather, it was her encounter with the "mystery" that was involved in many of the activities in the computer lab. Often, Kathy felt overwhelmed with unpredicted events that took place in the lab and that usually needed immediate attention and response. I described such a moment in which many things took place simultaneously.

> The computer lab becomes quite hectic. All are ready at the same time, and want her attention and help. Kathy tries to save Ben's work on a disk. It doesn't work. She thinks the computer is jammed. Then she looks again and says out loud: "Oh no! You won't believe what I just did! I put in the program disk instead of the disk we save our work on! " (F. N., Nov. 25, 1992)

If Kathy felt she was an experienced teacher in her classroom, walking in friendly territory, in the computer lab she felt like a novice teacher trying to survive.

> It just seemed like a day by day in there. You know, you kind of go in, and I go in with some sort of a plan in my head as to what I want them to do and then whatever happens, happens. I guess I don't think about it the same

> way I think about it in the classroom where you set up certain expectations, you know that this is what you want to do and so you set it up that way. Well I don't do that in the computer room. I just kind of go and I take whatever comes. (Con., Dec. 9, 1992)

Sometimes Kathy was pleased with the progress in the computer lab. But, at times, after experiencing moments of satisfaction and success something would go in an unexpected direction. Kathy described how she felt.

> It is almost like someone is in there because it seems to be the way things are working. It works a little, and you just think that you are getting ahead, and then something is happening, and then it works, and then something happens. (Con., Nov. 18, 1992)

Kathy wanted to be more in control of the outcome of her activities with the computer. Some of the experiences she had left her with the feeling that the computer was more in control of her actions.

> When I put something on the screen I want to put it the way I want it, not just the way I think I can. To have something in mind, put it on the screen, print it out and know what's going to look like. (Con., Nov. 13, 1992)

Diversions and "surprises" happened in the "home" classroom regularly. Kathy welcomed them. However, in the computer lab, a place she considered to be foreign to her, "surprises" only intensified her feeling of insecurity and alienation.

Kathy discussed the contrast between classroom situations and lab situations. In the classroom Kathy felt she was in control. She depended on her knowledge and experience in her daily work. She knew what to do, when to do it, and how to go about doing it. When I asked Kathy to describe that knowledge it appeared not to be easily articulated.

> But I don't know, you just seem to know. You just have this intuition that you know what to do... It's just something from within, it's like ... sometimes your greatest teaching moments happen, they just happen... even just the way you decide to introduce something, or explain something, somebody asks a question, you are trying to help him understand, maybe a concept, and then through figuring out where they are at and where you want them to be, an idea comes. (Con., Jan. 13, 1993)

Kathy felt she could "think out" her lessons for the classroom. She "sketched" out lesson plans in her head. This "mental planning" (McCutchan, 1982) in which she could also foresee what might happen did not take place when she was planning for the computer lab. "I don't really have a frame of reference to go on." Usually she worked with a framework rather than with rigid lesson plans. Kathy described that style of planning as "more of a global sense." She was comfortable with it. Kathy perceived such planning to be challenging: a style that offered many exciting moments.

> Somebody says something that sparks an idea and you just let it take shape, and all of a sudden you have this wonderful lesson that you never could have, or I couldn't have anyway, in a million years of plans, and that happens all the time. (Con., Jan. 13, 1993)

Kathy's knowledge of "what", "how", "when", and "why" was crystallized through the continuous interaction and dialogue she had with the students.

> It just happens because of the dialogue you have with a student or with a group of kids, and I think the more you have that, the better you are to try to create those situations too. And so you just have this great big storage bank that you can fall back on, and also knowing that other things will come along. (Con., Jan. 13, 1993)

Kathy described herself as a facilitator who was engaged in a learning experience with her students. "I see myself as a facilitator providing the right sort of experiences for the kids working with them learning with them" (Con., Dec. 2, 1992). This mutual process contributed to her knowledge, knowledge that Kathy referred to as "this great, big storage bank" which she recollected when she taught in the classroom. However, according to Kathy, the knowledge that was on call in the classroom seemed to offer limited help with her experiences in the lab.

Improvisation

In a number of our conversations Kathy described the situation in the computer lab to be unique. She felt that her knowledge was useless in the computer lab. I found this observation to be intriguing. When I listened to Kathy's stories about her classroom practice and when I observed her during computer classes I could see more of a parallel between the two rather than a gulf. In the computer lab Kathy was faced with some extremely complex situations. It appeared to me she coped with those situations much like she did in the classroom when "surprises" occurred. I believe she used improvisation, discovering the path and shape of the computer experience as she went along rather than pursuing a predetermined path (Bateson, 1990).

Kathy illustrated how she was constantly modifying plans on the spot and was able to handle unexpected situations in the classroom. "If I'm teaching something in math, and I find it too difficult (for the students) then I figure a different way of doing it (Con., Jan. 13, 1993). She further illuminated this aspect of her knowledge by describing an incident in which she was teaching the poem, "The Highway Man". Kathy felt her students were not reading the poem to the right beat so she asked them to start clapping as they read in order to feel the appropriate beat. She concluded by saying, "I knew what to do. I've done similar things before" (Con., Nov. 18, 1992). She mentioned that even the curriculum guides in the area of computers were vague in setting up goals or expectations. This added to her feeling of walking in the dark. On the other hand, the rest of the curriculum was much better defined. Consequently, she could set up clear goals.

> When they are writing I know what I'm looking for, I know what I like them to be able to accomplish at the end of the year, at the end of the month, at the end of the week, at the end of a project. (Con., Nov, 19, 1992)

Studies in the area of personal knowledge suggest that this kind of knowledge is tacit (Polanyi, 1958; Schön, 1983; Connelly & Clandinin, 1988; Carter, 1992). Polanyi describes the tacit component of knowing as an integral part of knowledge. "Into every knowing there enters a tacit and passionate contribution of the person knowing what is being known, and that this coefficient is no mere imperfection, but a necessary component of all knowledge" (p. 312). As I worked with Kathy, I realized that Kathy was not always aware of how her personal practical knowledge was expressed in her teaching in the computer lab. She felt that her knowledge was irrelevant when computers were concerned. In fact, Kathy drew upon her knowledge of the students, her instructional knowledge, and the knowledge of herself to improvise in many of the unplanned moments that she experienced with the encounter of computers. Kathy's personal practical knowledge was expressed when she was thinking aloud in the lab while circulating among her students. She was assessing the way she introduced her students to the new program. "You know I would never teach this program again the way I did, letting them get into the tutorial themselves" (F.N., Oct. 28, 1992). She was evaluating her first class and sensing that the tutorial was an overwhelming experience for the students. Later, Kathy decided to alter her original plan. Initially she thought her demonstration would carry over to the rest of the program. She thought one extended presentation and individual assistance afterwards would suffice for the students to continue independently with the writing program. When she realized that many of her students needed much more assistance than she had anticipated, Kathy made plans to do some more "modeling" in small groups rather than for the whole class. She also thought it would be valuable to have students work individually on a computer rather than always in pairs.

> Kathy was considering for the next time having 4-5 students use computers independently rather than in pairs and have the rest work on math games in pairs. She pointed out to me that when working in pairs with the writing and publishing program, students lost interest when their computer mate was using the computer for writing and they had to wait for their turn on the computer. (F.N., Oct. 28, 1992)

In assessing students' progress and reactions to the work with the tutorial part of the program Kathy thought that they might benefit more by using more relevant material for their practice. She asked them to take into the computer lab a paragraph they had been given for dictation, and to use it to practice the tutorial rather then the irrelevant material the program offered for that purpose. She hoped that would make the tutorial practice more meaningful to them.

After one demonstration to the whole class Kathy went on to work with small groups. It was then that she noticed there was much they needed to learn about the program. "I was surprised by what they didn't know" (Con., Oct. 28, 1992). She attributed the students' difficulties to the program being too "wordy" and difficult to understand. Since she knew that her students had problems in handling long explanatory texts and that their time in the lab was limited, Kathy decided to demonstrate parts of the tutorial in small groups rather than have them work on the computer individually. In so doing Kathy bypassed some of the limitations posed by the students' reading skills.

Kathy modified and improvised as she went along. When she realized that poor keyboarding skills hindered the students' ability to publish their stories in what she considered to be a reasonable length of time, she asked the students to use the same program to publish their poetry. She wanted them to experience a sense of accomplishment with their computer assignments. Although she had planned to use the writing program for a few months she decided after a while to have the students use other programs as well. The other programs were those the students were familiar with from previous years. Kathy sensed her students needed a change at that point. In some computer classes she had the students work with the writing and publishing program for 30 minutes and use the rest of the time to work with math or spelling programs of their choice.

Kathy evaluated the experiences in the computer lab after each class. In an effort to assist her students better Kathy thought she needed to spend some time in the computer lab before she would proceed with the coming classes.

> I am going to have to get into the lab before them, and then think, you know, think clearly about what I want to do next time with them. (Con., Oct. 28, 1992)

For Kathy the new experience of teaching with computers prompted more "surprises" in the lab situation than she was accustomed to in her classroom. On a number of tense moments in the lab I observed Kathy handling the students and the computers and mused as to her composure. I shared with Kathy my thoughts and added that under similar circumstances I could not envision myself proceeding with the calmness she expressed. Kathy smiled and once again the familiar spark appeared in her eyes. "I go by my wits", she said. I believe what Kathy referred to as "my wits" was Kathy's personal practical knowledge which guided her in the context of the computer lab. Improvisation, as part of that knowledge, appeared to have been on call in her way of making meaning of teaching with computers.

Humor

"You have to laugh, what else can you do?" was Kathy's way of dealing with some unexpected moments in her experiences with computers. Humor was a thread woven into Kathy's practice as a teacher and into her relationships with her students. It emerged sometimes in the way she negotiated matters with her students but especially when confronted with unplanned, tense or "surprise" situations. Kathy's natural way of resorting to humor helped create a sense of informality and ease in her classroom and many times helped to break tension in the computer lab. Kathy's students often picked up on that and responded with humor too. However, the use of humor and the informal atmosphere in the classroom, as well as in the computer lab had never crossed the line of respect and affection that Kathy and her students had for each other.

Many moments of obvious frustration with the computer were dealt with through humor by Kathy. In an attempt to bridge the uncommunicative and impersonal nature of computers Kathy personified the computers and attributed human traits to "them". She described a time when she put a disk in the disk drive and the message on the screen read: "check start up device". Kathy tried again and the message repeated itself. She felt she wanted to talk back to the computer. "What do you mean, check up starting device? I checked it, nothing is happening, you know, do something different" (Con., Nov. 18, 1992). On another occasion, Kathy was reminded of one of her first experiences with printing. She described how the printer printed a garble of words in some long narrow columns rather than the text she and the students were expecting. Kathy was frustrated and amused at the same time. She called the computer "that little traitor" explaining that, a day prior to the computer class, she had used the same printer by herself and it worked well. She went on saying that "he was doing it on purpose" embarrassing and betraying her publicly, while in private when she used "him", "he" printed beautifully. She decided "he" probably "needed a smack on the side". Later, she took the peculiar looking printed work and shared it with her colleagues in the staff room "having a good laugh at it".

Kathy's relations with computers resembled a form of "joking relations" (Radcliffe-Brown, 1940). This term, borrowed from anthropology, describes joking targeted at persons and events (Dwyer, 1991) in order to ease tension. It seemed to me that in Kathy's experience she expressed that behavior with persons and events as well as with objects, that is, the computers.

One day when a student complained about a disk that was stuck in the computer, Kathy sent someone for a paper clip explaining that she had learned how to eject a disk with a paper clip. A worried student wondered if she would be electrified. She looked at him with an amused expression and assured him she would not be electrocuted, immediately adding that, just in case it did happen, he would be better off not to touch her because "electricity travels".

In what appeared to be one chaotic moment, in the computer lab, when a number of students completed their work simultaneously and calls for Kathy's help with printing came from all directions, Kathy was overwhelmed. For an instant she stood lost, with her hands holding her head. But, within a moment, her hands were down again, and she quickly moved toward one computer and reminded the student of the different steps of printing. A while later the loud sound of printers became the dominant sound in the room. It was music to Kathy's ears. She declared loudly: "Now we are cooking! Next please!" There was laughter and the hectic, tense period faded away.

Kathy used humor and a form of "joking relations" with her students and the computers. It appeared to ease both subtle and obvious tension, to bridge her lack of experience in the lab, and to make the computer experience more personal.

Questioning the value of computers

"What do we need computers for?", "Are they valuable?", "Is it worth it?" ,"Is that what the kids need most?" These were some of the questions Kathy asked herself before she first started to teach with computers, and during the three months we worked together.

Those questions still hung in the air when we parted in mid-January. "That", "they" and "it" referred to computers. The questions very much remained unanswered.

As much as it was Kathy's choice to incorporate computers into her work, and although she described herself as becoming more confident using computers, she lived through a period of uncertainty and doubts about the value of the whole experience. Not only did Kathy become more competent in using a computer personally, she also became more competent in teaching computers. But, the more she came to know computers, the more she questioned their use in school. Kathy became increasingly aware of the many problems her students encountered in the lab which she was unable to solve. She was frustrated. "I am not able to teach the way I like because I'm not fluent with the material" (F. N., Nov. 4, 1992). Kathy felt that her lack of experience prevented her from foreseeing difficulties. Difficulties just happened.

Many problems originated from improperly functioning machines. Technical problems such as impaired disks, malfunctioning computers and printers, caused frustration and wasted a considerable amount of time. Kathy became dispirited over the time issue related to the use of computers. There was no specification as to computer time or place within the curriculum. Kathy decided to incorporate the computer hour within her Language Arts curriculum. She was puzzled about time not only as a commodity but also about the proper use of the time in computer activities. Since her students had poor keyboarding skills, it took them a long time to publish their work, much more time than Kathy anticipated. On many occasions, the students had to leave the lab with what Kathy referred to as "unfinished business". Students were unable to finish publishing their stories within the one hour time of a computer class. Since a week was the interval between classes, the stories became "old" and sometimes irrelevant to the students' activities. Many of them lost interest in pursuing their writing. There was also a problem that could be described as "what you see is not always what you get". It referred to the different format in which printed work appeared on paper compared to the way it appeared on the screen. "To me the way it looked on the screen and the way it's printed out are two different things" (Con., Nov. 13, 1992). Kathy was also concerned because the program was a foolproof one with no possibility for students' creativity or deviation from the strict script. This foolproof style of programs contradicted her own style of work, that is, one that was open to improvisation and change on the spot.

However, it was not only the particular program that Kathy had chosen to use that prompted her questions and doubts concerning computers. Repeatedly, she expressed doubts as to the place of computers in elementary schools. In the lab one day, while circulating among her students, Kathy said:

> We have always just had a lab, we never discussed it in the staff room if the other way (having a computer in the classroom) is better. To disassemble it ... the parents will be upset because a lab is (in irony) progressive but from an educational point of view, I'm not sure. (F. N., Nov. 4, 1992)

Kathy felt that the more competent she became with computers, the more she could evaluate them with a critical eye. She wondered if just because they were considered to be the latest technology meant they automatically earned a place in schools. Kathy also had serious doubts as to the investment of so much money in computers at a time when many schools lacked well-equipped libraries, art rooms, or gymnasiums. "Why are we doing this? why are we bothering, when libraries, there are libraries in Edmonton schools that are so suffering" (Con., Jan. 13, 1993).

Kathy expressed a view that computers in some ways may have "changed the job description." To illustrate it she said that some activities that used to be done by the secretary, like typing letters or other forms of information to students and parents, were now being transferred to teachers. Since most of the teachers in her school were, now, performing those activities by themselves on the computer, Kathy felt reluctant to ask the secretary to do it for her, even though she knew the secretary would be willing to do so.

At one point Kathy said she could see how a computer could be a useful tool for her work as a teacher. Like some of her colleagues, she could use it to write newsletters to the parents and report cards for her students. Later, more doubts surfaced when a friend shared her daughter's report card with Kathy. It was printed on a computer but the teacher had added comments in her hand writing beside the typed part. Kathy realized the teacher had felt a need to add a more human touch by adding her own handwritten text to the computer produced report card. This raised another issue for Kathy. She wondered if we lost some of the personal touch of student-teacher relationships through computers. For example, one of the ways Kathy knew her students was through their handwriting. A handwritten piece with its specific curving of letters, the particular way in which space was used, the margins, the pressure of the pen on the paper, all told a story of a unique child. Kathy could immediately connect a child with a piece of writing. She wondered if she was about to lose that personal touch.

> You know it loses its ... the personal touch and may be that's what bothers me about the kids too. That it needs to look like you can't associate it with them. I can pick up any body's paper and pretty much decide or know whose it is because I know their hand writing and you lose that. (Con., Nov. 18, 1992)

Moreover, Kathy really worried about the kind of message we were sending to children by promoting computer published work over less "perfect" hand-written work.

> What are we saying to them? What is important? What is important are their ideas and their work, not the way it looks! (Con., Nov. 18, 1992)

She wondered if we were not devaluing work written by hand, putting effort and time on appearance rather than on thoughts and ideas.

Kathy's reflections on the computer experience

In our last taped conversation Kathy reflected on her computer experience. She seemed to differentiate between her personal experience with computers and her attitude and beliefs as to teaching computers in elementary school in general. Personally, she expressed a sense of accomplishment.

> Quite a bit has happened in the last months. When we first started I didn't have any of the language, computer language. Now, I can use the proper language and terms with the kids ... I'm feeling a lot more confident, my confidence level has grown. (Con., Jan. 13, 1993)

Kathy illustrated the change in her confidence level by saying that many of the activities in the lab became "very automatic". She no longer needed to explore all possibilities when something went wrong. She would pretty much know what to do in recurring situations.

> For instance, today, when some of the kids couldn't get their disks to work. Two months ago I would have run over, I would have checked it and I would have put it in myself. Then I would have had, maybe, another disk to check that computer, or have taken the disk that was supposed to be faulty and checked it on another computer. But when I was doing it I was thinking, now (in a somewhat anxious voice), what am I supposed to do? What am I supposed to do here? And I wouldn't really be sure ... now, it's very automatic. When something like that happens ... just feeling more confident in knowing how to deal with the different problems up in the computer room. (Con., Jan. 13, 1993)

In the beginning Kathy relied only on the school coordinator for guidance with her computer program. Later she became more of a seeker and, as a result, became more familiar with the variety of programs that existed in school. Initially she thought the writing program would be a useful "kind of an extension of the Language Arts program" because it worked that way for the computer coordinator. With time and experience, Kathy changed her mind when she considered the program's disadvantages and the lack of interest on the part of the students.

Kathy also examined her attitude toward having a computer in the classroom. For a while, she believed having a computer in the classroom would mend the problems of dealing with the computer lab schedules and with having to leave the lab with incomplete assignments. Kathy realized that having a computer physically in the classroom did not necessarily mean using it. Her beliefs, her priorities and technical difficulties blocked the use of the computer.

For the near future, Kathy envisioned her teaching of computers mainly as a mutual exploration of a variety of programs with the students. As for her personal use of a computer Kathy had come a long way.

> I feel quite confident with being able to use a computer. I'm using it a lot for myself. I type stories that my adult student writes. I would like to get my own computer. (Con., Jan. 13, 1993)

Kathy was there, in the lab, an active participant in the computer venue. At times she was overwhelmed, at times she triumphed. But she was there by choice searching for meaning. It was time for Kathy.

CHAPTER SIX

Bonnie

I first met Bonnie walking briskly towards me in the school hallway, near the principal's office. She appeared tremendously energetic. And energetic she was. It did not take me long to realize that Bonnie was constantly on the move, did not waste any time, and was always engaged in one activity or another. Bonnie seemed very enthusiastic about her work. When I commented to that effect, she said the day she lost that enthusiasm would be her last day in school.

Bonnie has had a variety of experiences in her 16 years of teaching in elementary schools. She started as a Kindergarten teacher, taught special education, year one to year six, and a year ago came to her present school as a year one-two teacher. Bonnie had taught for 16 years, the last seven of them part time. Currently Bonnie teaches her year one-two class in the mornings only. Bonnie teaches Language Arts and Social Studies while her team partner teaches Math and Science. Bonnie had taught in a number of schools. She described some of the changes in her practice as a teacher.

> When I came here to this school, last year, this was a major change. Kindergarten is very different ...Other changes have been when I went from Kindergarten to teaching Special Ed grade 6 boys and girls. Ahm, that was a big change and then I went through a variety of Special Ed programs, went back to Kindergarten for a while. And now I'm here. (Con., Nov. 19, 1992)

Variety and change appeared to be central to Bonnie's work as a teacher. She loved change and sought it out.

> I get a little stale if I am in something too long ... I get a little tired of it and I'm not as stimulated and I don't feel that that's as good for the children ... I look for change. . . I like to do something for a few years to feel that I've gotten somewhere with it and that I feel satisfied that I'm doing a good job, But then I like to move on. (Con., Nov. 19, 1992)

Two events brought Bonnie into teaching: a conversation with a high-school counselor and a short experience in the work force. As a high-school student Bonnie described herself being "channeled" into the honors program. There she found she was surrounded mainly by boys. Her program included mostly science courses. Bonnie's experience in the honors program resulted in a strong resentment towards the sciences. In grade 11 Bonnie went to discuss her post secondary career with the school counselor. She told him she was looking for an area that would require minimal science courses. Bonnie remembered the counselor flipping through the university calendar and asking "How about Education?" Bonnie said it sounded "okay" to her even though she admitted to not giving it much thought. In hindsight, she said she was quite angry with the counselor because of his unthoughtful counseling. He did not discuss potential choices with her and he did not wonder what made an honors student seek further education with no study of the sciences. When she reflected on that day she said she would have liked it if he would have given more guidance and offered her a variety of possibilities instead of just coming up with what seemed a casual answer. Bonnie said she was always inclined toward the nurturing areas such as medicine and nursing, but she was discouraged by her counselor's response.

After completing high-school Bonnie decided to work for a year. She felt she was not ready for university because she was not sure about what she wanted to study. Two weeks of work in what she described as the "money making industry" convinced her she was in the wrong place. She knew it was not the kind of life and career that suited her beliefs and priorities. At the end of the year she enrolled in the early childhood program in the Faculty of Education.

Bonnie's school

Bonnie's school is situated in a quiet residential area. It is a large old building, built in the late forties, a time when this neighborhood was inhabited by young families with school age children. Gradually, over the years the number of school age children decreased significantly. Currently the school has about 130 students.

The school building has two long one story wings joined in the center by a two story section, the gymnasium. The exterior of the school seems quite dreary with its lower part covered with red bricks and the upper part painted yellow. In front of the school there is a large lawn that was covered with snow for most of the time I spent in the school. In the center of the lawn there are three benches facing each other, young native Alberta trees planted near by, and a large rock with a plaque that reads: "Oak's Grove 1991, built as a symbol of caring for the environment by students, staff and community with support from the Shell environmental fund."

The school's main entrance leads to long hallways with classrooms on either sides. The old looking building and its unimaginative architecture is only the external shell of the school. Within its walls there is a warm feeling that comes across from the small but caring and welcoming community. It is Bonnie's second year of teaching in the school.

Bonnie's classroom setting

I have spent five months in Bonnie's classroom: three months in the role of a participant observer as well as a helper with the computer program, and the other two months as a helper. In my role as a participant observer I spent two mornings a week with Bonnie and the students. The computer activities, like most of the class activities, took place in the classroom.

The classroom layout reflected both Bonnie and her students. It told stories of Bonnie and her students' relationships, stories of changing seasons and special events and an acknowledgment and love for literature.

Room 10 is large and bright due to the large windows that made up the wall opposite the entrance door. In the front part of the room, students' desks were arranged in a square so students could face each other. To the left of the desks stood a water table, next to it a block area, and a small rug area. Further on there was a round table with chairs and a math center. Both the small rug area and the round table were used for reading activities. Between the students' desks and the large rug area was an art area made up by two long tables covered with plastic. The large rug area was home to a variety of reading activities for all 24 students. This special area was surrounded by many book shelves on which a variety of books were displayed. This area also held a "big book" stand, a pocket chart for poems, an easel, and a message board. Students' work, posted on the classroom walls and sometimes on the ceiling, reflected a variety of themes that were changing periodically with the change of seasons, programs and interests. The alphabet with pictorial illustrations was placed over the blackboard. Students' art work decorated not only the classroom walls but also the nearby hallway walls.

When Bonnie introduced the “bear” theme, there were bears all over the classroom. Books about bears were on display in the reading area, bear shaped books were written by the students, and three dimensional bears painted by the students hung from the ceiling. When I came into the class one morning I noticed a "bear cave" made out of brown paper built around a table. Students were staying in the "cave" experiencing "living" in it.

Another special place in the classroom was the two stairs loft that held the teacher's desk and the computer. When I first came to Bonnie's classroom in October, there was one computer there. When I left in March there were two computers and a printer.

Bonnie’s classroom always seemed active with purposeful activities. Students seemed highly motivated. They stayed with their tasks without asking Bonnie for help. I was surprised one morning when I arrived at the class and realized that Bonnie had stepped out for a moment. Not even one of the students "took advantage" of it. They were all sitting or lying on the carpet immersed in their morning reading. They raised their eyes from the books, greeted me with a "Hello", and went back to their reading. It appeared students knew what to do and were interested in what they were doing. They moved peacefully and in an orderly way from activity to activity. The active place did not turn into a chaotic place.

Bonnie's beginnings with computers

One morning in June 1992, Bonnie walked into her classroom and found a computer had been placed there.

> It showed up in my classroom. I had no warning it was coming. Probably somebody said it was coming and you know there were two teachers, we shared a classroom, and maybe she knew and maybe I didn't know. I don't know how it happened, but one day it arrived. (Con., Nov. 5, 1992)

Bonnie was not prepared for it. Machines or mechanical devices in general were not her bent. She was always drawn by what she called "antiquated art forms". She loved weaving, knitting, and water color painting.

> I loved to do anything with my hands. I learned to knit when I was probably in grade four or five. I knit my own first sweater that I wore in grade 7, so that would have made me 12 years of age. It was just something I very much enjoyed doing as a child and one thing led to another. (Con., Nov. 5, 1992)

She loved to create things with her hands. For Bonnie, a dream come true would be a time in which she would "just go to Fort Edmonton and be a volunteer and sit and do spinning and weaving. I would just love to do that" (Con., Nov. 5, 1992).

Bonnie had ignored computers for many years. Some of her schools did not have computers. Others had computers except in the Kindergarten where she had taught. About ten years ago a computer lab was to be installed in her school. The whole staff became involved in a computer course. Bonnie joined that course because she felt compelled to do so. Since everyone else was going to take the course, she felt it was expected of her to do the same. However, her decision to take the course involved more than that. As a teacher, Bonnie always wanted to take advantage of any learning opportunity available to her. As resistant as she said she was towards computers, she thought she ought to take that course for her professional benefit. Bonnie commented on that experience.

> I didn't feel comfortable when I took that course, I took the course but really didn't use the computer a lot, so I never felt comfortable with it. I've just forgotten. (Con., Nov. 5, 1992)

Bonnie did not use the computer since computers were not part of that school's Kindergarten program. Over time, she forgot the little she had learned. She almost forgot the whole experience because it had no meaning for her.

Just as she felt she could not miss a professional opportunity by not taking the computer course ten years ago, Bonnie thought that a computer placed in her classroom could not be ignored. Bonnie's drive to improve continually her teaching skills would not allow her to ignore the computer in the classroom.

> I'm not that type of person. When there is an opportunity for growth and learning I take it. I couldn't do that (ignore the computer). It would be a waste. (Con., Nov. 5, 1992)

She could not see anything wasted; be it time, opportunity, or skill. However, she felt that situations and the timing of opportunities were also very important considerations in what she was doing. There were times and situations in which she could not have undertaken another challenge.

> I certainly think that there are times when you feel satisfied with what you are doing and you sort of say: give me a break here to catch my breath and solidify what I am doing and don't ask me to do anything new. (Con., Jan. 21, 1993)

This was probably the case last June when the computer "appeared" in her classroom at the end of the year. The timing was not right. But this was not the situation for long. Having a son of her students' age, Bonnie noticed he had an interest in computers. She was aware that her son's interests reflected her students' interests. Like in many other occasions, Bonnie's life as a mother connected with her life as a teacher. Her son's enthusiasm for computers shed new light for Bonnie on computers. Reluctantly, emphasizing that she did not seek computers out, Bonnie decided that teaching computers would become one of her goals for 1992-93 year. Her decision was based on her meaning of what it meant to be a good teacher, that is, "doing the best that I can for the children", as well as her sensitivities as a mother, and the circumstances of her immediate environment.

Preparing for the computer experience

Cautiously, but with careful planning, Bonnie entered the computer experience. Admitting she felt compelled to use the computer, she had very modest aspirations, that is, "simply to get to know the computer" and "to use it somehow in the classroom" (Con. Dec. 1, 1992). During the summer Bonnie discussed her plan to incorporate a computer in her teaching with friends who had been using computers. She visited the downtown library to look into different computer programs. With advice from a close friend, Bonnie decided to use one program for the coming year. She chose a writing and publishing program named "Magic Slate". This particular program was chosen because Bonnie envisioned the computer experience to be part of the children's writing and reading experience and part of her Language Arts curriculum.

> This is part of my curriculum. It is not a separate part, it is an integral part of the writing process for us ... I am not interested in using it for games because I teach Language Arts and to me writing and reading is the learning process there, and speaking and listening and everything else. I don't want it to be separate. (Con., Jan. 7, 1993)

Bonnie wanted the computer experience to be meaningful for the children, related to the work they did in reading and writing. Having a computer in the classroom rather than in a separate computer lab, enhanced Bonnie's choice to make the computer a connected part of the classroom experience for the students and herself.

Bonnie had a computer in her classroom since June 1992. While she had considered using it since the summer and had made plans for it, she did not start teaching the computer until late in October. During the time I spent in Bonnie's classroom and through our conversations, I came to know Bonnie's "rhythm of teaching". She worked around school cycles. Bonnie said that there were a number of considerations that postponed employing the computer in her teaching. She waited for the right situation and the right time. Bonnie described the beginning of the year as a hectic time for her. She had a large number of year one students who needed much attention and direction in their new experience in school.

> I had a lot of year ones and not too many year twos. And year ones aren't very independent, they need lots of help and we were working mainly on that. Being independent, getting letters down on paper, thinking about words, and drawing pictures that we could write about. That's a big process and I just didn't have time to get to the computer. (Con., Dec. 1, 1992)

The beginning of the year was not the proper time, for Bonnie or her students, to embark on a totally new endeavor. Among the considerations for the delay in beginning to use the computer was Bonnie's concern about one child with a serious behavioral problem who needed constant care. Two months later, with the year one students much more independent, with the child with special needs better adjusted and with my arrival in the classroom as a source of help with the computer, Bonnie felt it was time to begin to teach computers.

From the beginning, when she first planned to teach with computers, Bonnie was very clear she could not do it on her own. She could not imagine leaving her students unattended while she worked with one child on the computer. This contributed to one of the reasons Bonnie agreed to take part in my study. She perceived me as someone to help with students on the computer while she was with the rest of the class. As much as it was Bonnie's decision to delay teaching the computer, Bonnie felt guilty for not using the computer until late in October.

> I was feeling guilty that I wasn't working on the computer yet. ... because it was just sitting here and I wasn't using it. ... I can not waste anything, compulsive! (Con., Dec. 1, 1992)

A morning in Bonnie's classroom

Bonnie viewed teaching computers as part of her Language Arts program. She wanted the computer experience to be a positive and connected experience interwoven with the students' daily activities. To understand the manner in which Bonnie integrated the computer in her Language Arts program and since the computer became part of the morning activities I describe a morning in Bonnie's classroom.

One by one the children arrived each morning. They placed their footwear on special shelves in the hallway next to their room. Within seconds the 24 students of Room 10 put on their indoor shoes, removed their chairs from their desks and sat down. Some days Bonnie entered with the children singing one of many "good morning" songs she created. The students joined in enthusiastically: "Good morning, good morning to you, good morning to you, oh how do you do?" Soon after welcoming each other through singing, Bonnie and the students walked over to the rug area. Students settled down on the rug. Bonnie took attendance and sent the helper of the day into the office with the attendance report.

Poetry time followed. Every day was a day for poetry in Bonnie's room. Using the special poetry chart which held all the poems they had learned and which were hand copied by Bonnie on large sheets of papers, poetry was read each day. Poetry time lasted for about ten minutes or longer, according to Bonnie, "depending on how enthusiastic everyone is that day" (Con. Dec. 1, 1992). A poetry flip-over chart was used to read and re-read favorite poems. The choice of poems for the day was shared by Bonnie and the helper of the day. They each got to choose poems. Using a pointer the helper led the oral reading of the poems. It was fascinating to listen to the different beats and rhythms to which the children read, chanted, or sang the poems. Poetry was followed by D.E.A.R. time - Drop Everything And Read. D.E.A.R. time was the sustained silent individual reading that lasted between 10 and 15 minutes. After they finished reading and the books were put back, students and Bonnie assembled on the rug facing the message board. There was a written message on the board every day. Messages related to activities, events or plans for the day. The messages were usually written by Bonnie earlier in the morning. For example:

> Good Morning!
> In writing workshop we are going to continue writing our bear stories.
> Love Miss _____. (F. N., Nov. 12, 1992)

Sometimes messages were written together by the students and Bonnie. Messages also served as mini lessons in reading. Bonnie used the short sentences to practice some reading skills.

> "Who can find a word they know how to read?" Different students tried out the words they recognized in the message. Bonnie is continuously encouraging children by positive comments such as: Good reading! I'm impressed! (F. N., Nov. 12, 1992)

This activity was usually followed by the reading and writing workshop in which students either responded to literature they had read or wrote their own stories. Students went back to their desks and wrote stories or wrote in their journals. When Bonnie began using the computer, D.E.A.R. time, and the reading and writing workshop were the periods in which individual students worked on the computer. On the days during which I attended Bonnie's class, the time after morning recess was mainly devoted to activities such as spelling and phonics. It was also social studies time and shared reading time. "Shared reading" was a time for sharing a book in pairs or in groups of three. Students shared a book which they had taken home to read over night. This "shared reading" offered them a second reading opportunity, this time to a friend. Throughout the morning, students moved from one activity to the next activity to a variety of cues Bonnie used: a short verse put to music, a tune played on the musical key board or light flashing. All activities were carried out with very little talking by Bonnie. It seemed much work was done in a relaxed and comfortable atmosphere.

Bonnie's first computer lesson

Initially Bonnie decided to introduce the writing and publishing program only to her year two students. She felt it was too early for her year one students. A major concern for Bonnie was the way she would handle working with individuals or small groups in the loft while the rest of the students were doing other activities. She worried she would be unable to help them. She counted on me to assist her with teaching the computer. Later on she involved a number of volunteers.

On the morning Bonnie was to give her first lesson she assembled the students on the rug after reading time. They were about to read the message for the day which talked about the new activity. "Today we are going to learn how to write on the computer." The message ended as it always did with "Love" and Bonnie's last name. After they read the message Bonnie discussed the new activity. She placed special emphasis on the connection between writing and publishing work. "Publishing books are special because they tell us that we are authors" (F.N., Oct. 22, 1992). Bonnie read out the names of the year two students and asked them to follow her over to the computer. The rest of the students were to go to their desks to engage in writing. Once seated next to the computer, Bonnie asked the children to stand around her and watch the key board. Bonnie had placed a number of stickers on the main key board functions the students were to use: the return key, the shift key, the arrows keys and the space bar key. She explained to the students: "When you look at the keys you don't have to look everywhere, you will only need to use the special ones" (F.N., Oct. 22, 1992). Bonnie described the functions of the main keys, and introduced the program disk.

> We need a starting program. When the program is on the computer we can take the disk out. Now we can put in another disk, the data disk. This disk is just like a piece of paper. (F.N., Oct. 22, 1992)

Bonnie explained that whatever they write would be saved on the data disk "like it's written on paper." She demonstrated for five minutes. Bonnie asked the students to try and figure out the use of the arrow keys. She practiced entering a name into the program, writing some sentences, moving to a new line, exiting and saving the written work. After she had finished, she told me, "They seemed keen, attentive and interested" (F.N., Oct. 22, 1992). Bonnie stayed with Gail to start her off with her first published story. Gail, according to Bonnie, was a good writer. She had written a story which had already been edited by Bonnie. The rest of the students still did not have stories ready to be published. Although she did not finish typing her story that morning, Gail was extremely eager and enthusiastic about her first writing experience on the computer.

I observed Bonnie during the demonstration. She seemed relaxed. Everything was well prepared ahead of time: the stickers on the keys that Bonnie wanted to emphasize, the program disk, the data disk, and two small chairs that were placed next to the computer. The demonstration went smoothly. Bonnie had practiced on the computer at home. Her main purposes were to make the demonstration as simple as possible and the first experience by a student in publishing her work a successful one. Sometime later I shared my impression with Bonnie about how well prepared I thought she was. She confirmed my observation.

> By the time you came here in October I was set and ready, I knew what my goal was. I had spent some time downtown in the computer lab and had thought about it ... I did some thinking. (Con., Dec.1, 1992)

Computers as part of Bonnie's Language Arts program

The week after Bonnie's first demonstration, Bonnie asked me if I could help Gail finish her work on the computer. Gail jumped off her seat when she heard her name mentioned, took her writing notebook and went over to the computer. By then other students had their stories written and edited with Bonnie. Don was ready to publish his story and I helped him with entering the program and learning how to operate the different keys. I noticed that although both Gail and Don had no key boarding experience and the typing took them quite a while, they were still eager and proud to work on the computer. Since there was no printer in the classroom, at that time, Bonnie took the disk home, printed out their stories on her own printer, and cut and pasted each of them into a pre-prepared little book she had made. When she brought those little published books back to the students, they were to illustrate their stories and take them home to read to their parents.

The next time I came Bonnie asked Gail to show me the book she had published and illustrated. Bonnie also asked Gail if she would like to read it to me. Gail was proud of her first published book and she shared it with me. The book opened with a title page with the story's title and the name of the author. It also had a dedication note. The last page of the book was a page for comments by readers of the book. That format would become the style of all the books published by the students. The published books, after being shared with the student's family, were put on display much like other books in the classroom. They were available for anyone who wanted to read them. Student-published books became part of the class literature. They were also shared with students in other classrooms and with different members of the school staff. It seemed that Bonnie's reading and writing program had stretched over and now included the computer. The computer became an integral part of her Language Arts program.

Within a few weeks there were a number of year two students that had published their stories. In mid November Bonnie approached me one morning after I had come into the classroom and said, "I thought I'll take two year one students. Let's give them a chance too" (F.N., Nov. 12, 1992). Bonnie invited two year one students who had completed their short stories to work together with her on the computer. At morning recess immediately after she had introduced them to the program, Bonnie reflected on that experience. She said that initially she was concerned they might not be ready to use a computer for writing but she decided to give them a chance because they were good writers and it would not be fair to deprive them of publishing on the computer while their friends in year two had a chance to do so. Bonnie was very pleased with the experience. She connected their computer experience with their reading and writing experiences.

> In my opinion this was a wonderful reading lesson as well as a writing lesson. By seeing the words written in good print and in standard spelling, it's going to help them build more sight words and it's going to help them identify all those words when they are going to write again. That was my feeling. (Con., Nov. 12, 1992)

After working for a while with the two year one students, she suggested that they continue their work on the computer and help each other. Bonnie needed to return to work with the rest of the students. She stayed for a while and watched them work together. In a later conversation, she shared some of her observations. She reminded me how James who was helping Rose with her publishing was very particular with his help. He guarded Rose's spaces carefully. Bonnie was fascinated by his perception and dedication to helping his friend with keeping proper spaces. James had great difficulty remembering to use spaces when he was writing on paper. Bonnie wondered:

> It would be interesting the next time when he sits down to write with pencil. He just may have more attention to the spacing and things like capitals and lower case. I thought this was a very good learning tool for them. (Con., Nov. 12, 1992)

The pairing of the students appeared to be an important educational and social experience in Bonnie's classroom. On a number of occasions Bonnie asked students to pair up. It was a daily routine of the shared reading period. Children also paired up for art assignments, such as painting the three dimensional bears. They paired up to write cards for special occasions and for making potato pancakes during the Hanukkah celebration. Bonnie had them pair up for the computer experience too. She appreciated the first paired work on the computer. "They were very excited. It was just thrilling to watch them wasn't it? ... I think the value of the interaction was wonderful" (Con., Nov. 12, 1992).

Bonnie had come to view the first few experiences of the year two and year one students with the computer as successful and rewarding experiences. She noted that the year two students became almost independent very quickly. They did not require much guidance. Bonnie repeatedly acknowledged my help with the computer. She felt my help enabled her to attend to the whole class. She began to plan using volunteers for computer time on days I was not there and when I would no longer be in the class. Bonnie trained three volunteers and the computer was used almost every day.

Bonnie kept reflecting on and evaluating the issue of publishing student work on the computer. She perceived employing the new medium, the computer, as an extension to a process she used before she started to use the computer. Bonnie had published student books prior to employing the computer.

> What I did before using a computer was I simply took one of the little books and copied (student stories) in nice standard spelling and printing so that other children could read it. I wrote it out and then they illustrated it ... first editing their stories, then copying them into hand-made books. (Con., Nov. 19, 1992)

By using the computer Bonnie felt students added another dimension to the publishing process, that is ownership of their final work. "I think it's giving them more ownership of their published work" (Con., Nov. 19, 1992). Most important to Bonnie was that their experience with the computer appeared to enhance their reading opportunities. She illustrated what she meant as she described a student's experience.

> It's another step where she is reading more. Before, she would have read it to me ... now we have inserted another step in there and she is reading it as she types it, and then again she'll read it as she illustrates it, but you can't type without reading I don't think ... well it's part of the reading process because she is seeing letter T and finding T and she is, no doubt, also doing some internalization of sounds. (Con., Nov. 19, 1992)

Bonnie appreciated the feedback she got from her students in relation to the computer. They seemed to enjoy their work on the computer and found it difficult to wait for their turn. Bonnie felt they were writing more than they did before. She found it difficult to keep up with their wish to publish their work. "I wish I had more computers in the room because really we could use them" (Con., Dec. 1, 1992). Bonnie felt one computer was no longer enough to handle the demand for publishing. The opportunity to publish on the computer obviously motivated students' writing. Bonnie shared two stories illuminating the students' desire about writing and publishing on the computer. One such story was the story of Rodney. One morning he approached Bonnie and asked to work on the computer. Bonnie recollected their conversation.

> Can you wait until Tuesday? Rodney answered: I can't wait that long. I can't survive. I said: what's going to happen to you? I don't know but I can't wait that long... and everyday he came back and said I'm ready to do my story today. (Con., Dec.1, 1992)

When Bonnie realized there were too many stories to be published, she attempted to ease the pressure by suggesting that the students choose one story out of all of the stories they had written. Judy became really anxious to publish one of her stories. With amusement Bonnie told what happened. "She wrote two stories and she came to me every day: Is it my turn? Remember me? You have forgotten me ..." (Con., Dec. 8, 1992). Both Bonnie and I noticed that in most cases when it was time for morning recess children who were working on the computer were reluctant to go out. They wanted to keep writing. We tried to encourage them to go out for fresh air but they insisted on staying with their computer work. The students were taken by the computer experience.

One morning, early in December, when I arrived in the classroom Bonnie looked at me, smiled, and said: "Do I have a surprise!" Naturally I was curious but Bonnie did not add to that until lunch time. When we settled down for our weekly conversation, Bonnie said, with excitement, that her class was about to receive a second computer. I was aware of a tremendous change in Bonnie's attitude towards computers. But her story that day revealed much more. Bonnie was not merely going to become a recipient of a second computer. Bonnie's story was of actually soliciting a second computer. She laughed, somewhat embarrassed, when she recollected the event that took place in the principal's office. She had maneuvered her way into getting a second computer. She could not get over her sense that such an event would have been totally inconceivable a few months earlier.

> I was in the office and Colin was asking me about the program I use. And in the process of talking he said something about that and I said, 'well, of course that's while we have **one** (emphasizes one) computer in the classroom' and he kind of looked at me and said 'I've just ordered 2 new computers for the school.' I said "yes" and he said, 'But I didn't order one for your class. I didn't think we could afford it.' I said, 'Well, considering the fact that we got our first one last year and everyone else had theirs perhaps (very slowly and politely), they should come first in getting a second.'(I laugh) and then he said, 'What would you use it for?' And I said, 'Well I'm not saying that we are using the computer all day long every day by any means, but I said we will be very happy if we have 2 computers when we are doing publishing because I often have an adult there helping with children, and an adult could very easily help 2 children at computers that were in close vicinities.' 'What are you using the computer for?' And I said, 'Well for the publishing,' and I said, 'Ann, the afternoon teacher doesn't use it for that but she would probably use two computers too.' (Con., Dec. 8, 1992)

I found the story to reveal so much of the change in Bonnie's attitude towards computers, her confidence in using them and in her belief about their value for the students. Bonnie too, was aware of how she had changed within such a short period of time but she could hardly comprehend it. She moved from being "an illiterate" in computers, completely resenting them, to seeking out more computers for her classroom. And, indeed, it was not long before Room 10 received their second computer. It arrived just before Christmas but it was not put to work until after Christmas break. Once again the timing was wrong. As mentioned earlier, Bonnie worked around the school year cycles, balancing her schedule with the year's special events. The time before Christmas was not the right time to begin to use a second computer. More was entailed in Bonnie's decision to wait with the second computer until after Christmas celebrations and the Christmas vacation. Bonnie was not only waiting for the proper time but she also wanted to make sure they had all the needed support systems for that added computer - a proper location and a proper table. As Bonnie explained.

> It just sat there because I didn't have a table for it. I didn't have a location. We don't have a standard table or a set up for computers, every class does their own thing. So it took me some time to arrange that, to get desks from somewhere over there and have this table moved and that type of thing. And then I just plugged it in and that's all. (Con., Jan. 7, 1993)

As was usual with Bonnie, she wanted to make sure everything was ready for the second computer: a proper table for the new computer, suitable small chairs and a proper spot for it in the loft. Only then could the computer be put to use. When I arrived two days after Christmas break, the two computers stood close to each other. Each was on its own table in the loft. There was also a printer on a trolley. By then it appeared like a well-equipped computer center. The time was also right. I asked Bonnie how she felt with these new additions to her classroom and she answered,

> I feel great! Just great! I feel, you know, really how children must feel at times, very proud, thinking back where I was (laughs) in September.(Con., Jan. 7, 1993)

That morning, two days after Christmas break, was the first time Bonnie had planned to use the two computers and to initiate the printer. She wanted all of her students to see the first attempt at having their work printed in their classroom. When Rodney finished writing his story on the computer, she invited all of the students to gather around the printer. The children were very excited and rushed over to the printer. Bonnie checked the printer's connection, the paper, and put the printer to work. And it worked. They were all thrilled. Rodney proudly held his printed story and Bonnie turned to me and said, "I wish I had a camera." It was a moment to be captured.

After Bonnie's demonstration with the printer, I sat with two students at the computer and coached them with their work. What I had previously done with only one student, I now did with two students at a time. On those mornings when I was not in the classroom, the work on the two computers went on intermittently with the three trained volunteeers. Each volunteer worked one morning a week.

At one point I wondered how Bonnie would manage if a problem occurred. How would she deal with three machines rather than one. Bonnie said that since she had bought the same computer and printer for herself, she figured things out with a close friend who had more experience with that computer model.

> Well, at home every once and a while we had problems with the printer and my friend and I would work at that, she could do it, she is quite ... her bent is much more mechanical than mine, although you know with my sewing machine I can do things with it, you get to know a machine, and you can do it and I fixed the garage door all by myself, this Christmas the garage door, you know when you have to ... you have to do it, you learn and you start asking questions of people and you just eventually add a little more information to your knowledge base. (Con., Jan. 7, 1993)

Although Bonnie was not able to solve each problem, it appeared she was able to take care of most common problems that occurred.

> I can't solve all the problems but at least I know things how to take the printer apart and I know what to look for and the feeding of the paper. (Con., Jan. 7,1993)

The change in Bonnie was incredible. She was really excited with what was happening in her classroom regarding computers and with her own experience with the computer. I reminded Bonnie how she used to hate the computer. She just laughed. Even some mechanical problems did not seem to intimidate her as much as they did in the past. She described how she reacted to a problem with the printer.

> You know ... yesterday I didn't have that feeling, I thought to myself boy you have come a long way here because I used to just get totally frustrated and want to give up, I just hated it. And now ahm, I guess I saw the excitement of a printed something coming out of a printer that I have done and I knew the children would (be excited) and I wanted it for them. (Con., Jan. 7, 1993)

Bonnie and her students shared mostly positive experiences with the computer. Bonnie was thrilled by the students' excitement and zeal with which they worked on the computer. It enhanced her own positive feelings and experiences and acknowledged the benefit of the computer experience for the students as well as for Bonnie.

Computers as part of Bonnie's personal life

Bonnie's original plan to use the computer as part of her Language Arts program seemed to have worked well for her. After a short while and many positive experiences the computer was no longer a questionable experience. Bonnie acknowledged its value. But she did remember the beginning with computers as being somewhat intimidating for her, the machine, as well as the process of using it with children in the classroom.

> I was intimidated by the machine itself, I mean it's taken ... I've come so far in my attitude towards the computer that ah, I think all that process was intimidating me, the whole thought of having children using the computer in the classroom as part of the program, you know it just adds that element of confusion, (laughs) sometimes, and .. so yeah I guess certainly there was some intimidation there. (Con., Jan. 21, 1993)

But for Bonnie it was no longer a question whether to use the computer, it became a quest of *how* to best make use of it in her teaching. With time Bonnie became more interested in the possibilities the computer offered for her work as a teacher. She began to use the writing and publishing program for writing newsletters for the parents. It was not without some pain and frustration though. When she first started writing a newsletter on the computer she spent the whole day on that task and she was in tears doing it. Within a few months Bonnie completed the same task within an hour and a half. In December, Bonnie said she was using the computer all the time. For example:

> I got all these poems done the other morning, Christmas poems and bear poems ready to go, ready to put in our poetry book. (Con., Dec. 8, 1992)

With each day that went by Bonnie became more comfortable with the computer and saw more possibilities and value in using it both for herself and for the students. What started as a risky intimidating experience turned into a positive and valuable experience. What began as a modest and cautious goal "to get to know the computer" and "to use it somehow in the classroom" turned into a meaningful experience along with a search for more opportunities for using it. In mid November Bonnie had her report cards all written by hand because she felt she still lacked both the knowledge and the confidence to produce report cards on the computer .

> My knowledge was still limited enough and I have a minor heart attack when something goes wrong and everything is lost ... (dramatically) oh no, I have spent all this time doing this and I wasted this ... I didn't want the risk. I would like to make it a goal to do the report-cards on the computer some day. (Con., Nov. 5, 1992)

In December, Bonnie described the steady change that had been going on. It was then that the computer became an integral part of her life as a teacher. "Yeah, I'm using it all the time. Every week I use it" (Con., Dec. 8, 1992). The goal Bonnie had set for herself to have report cards written on the computer materialized some time before I left the classroom. The March report cards were produced on the computer. Bonnie learned and used, on her own initiative, a different program for that purpose, a new program learned from a friend. Bonnie shared the report cards with me with a sense of achievement and pride.

Narrative themes in Bonnie's experience

Celebrating reading and writing

"Oh, do I hear people reading! Boy it's the nicest sound to my ears! " (F.N., Jan. 14, 1993). Bonnie was enthusiastically celebrating the oral reading of her students. The whole class just finished reading "Three little pigs" in a poem version. They accompanied their reading with snapping their fingers to follow and accent the special beat of the poem. It was an exciting moment for all. Such moments were experienced daily in Bonnie's classroom. Both reading and writing were ongoing celebrations.

Reading took place in a variety of ways and places. Some reading activities were carried out by the entire class, some by groups that took turns in reading. Reading took place individually as silent reading. Reading was also a shared celebration by two or three students who each were given opportunities to read their favorite stories to a small attentive audience. Bonnie also read with individual students. It was not only the modes of reading that varied. It was also the places where reading occurred. Some reading activities were engaged in at particular spaces in the classroom. Collective reading and message reading took place in the large rug area. Students created spaces for themselves during D.E.A.R. time, that is, for individual silent reading, and during shared reading, that is, for paired reading. Some chose to sit or lay down on the rug. Others went back to their desks. Some wandered to the loft where the computer was situated. Still others sat on the stairs that led to the loft. There were also children who curled up under the round table in their own little spot. Reading for Bonnie and her students was not only confined to their classroom. They shared their reading skills and enthusiasm for reading with the Kindergarten children to whom they read stories. On other occasions students went to the secretary, the principal or other staff members to share reading with them.

Writing, much like reading, was also celebrated daily. Students were engaged in many writing activities. They wrote stories related to the literature they had been reading. Bonnie described using literature as a "spring board" for writing.

> Well it's using literature as your spring board and doing an activity that follows good literature and ah, so you use some book and do an activity with it. You write, you respond to that book, you know, that type of thing. (Con., Dec 1, 1992)

Students wrote their own stories on subjects they chose. They also wrote in their journals. There were many more occasions for writing. For Halloween, for Christmas and for Valentine's Day, students wrote on specially shaped cards. Students also wrote special birthday cards for the principal's birthday. They invited the principal into their classroom and read their cards to him. When I came into the classroom on Valentine's Day Bonnie and the students turned to me and sang me a love song they had prepared and presented me with beautiful heart shaped cards they had prepared while working in pairs.

Students' writing was encouraged, acknowledged, and highly valued. A special period called "author's sharing" took place a number of times each week. Students assembled on the rug to listen to their friends read their own written stories. It was a celebration and acknowledgment of students as authors. That celebration followed a familiar pattern. A student stood in front of his friends, read her/his story and showed the illustrations she/he made. After he/she finished reading, the students and Bonnie would clap and respond by giving her/him positive but specific comments. Bonnie commented that "author's sharing" seemed very important to the students.

> When children want to do "author's sharing" they just can't wait to do it. You sort of scrap your other plans and go with it. (Con., Nov. 19, 1992)

Being aware of her students' inclination to share their writing with their friends, Bonnie turned other activities into "author sharing" activities. For example, during writers' workshop when Bonnie circulated among her students and realized they were writing good stories, she would say, "I want you to turn to your neighbors and read what you have written" (Con., Nov. 19, 1992). When the students began publishing their stories on the computer they were eager to read and present those stories at "author's sharing".

Bonnie embraced every opportunity and made it into a writing and reading celebration. It was not surprising that the computer became part of that celebration. One of Bonnie's personal goals for the year was to make the computer an extension of her writing program.

> It fits with the goal that I have with writing and publishing, that's how it fits in so well. I chose the goal, last year, let me just think now, last year, one of my goals included the use of the writing workshop and the publishing of books. And I got a process going last year that I felt was satisfactory and I wanted to keep it going again this year and I had worked on that goal last year but this year I wanted to extend it and do the publishing on the computer, O.K.. so it's just an extension of what I did last year but it ties in with the writing program, with the Language Arts, the language learning, there is so much extension there it's an enrichment of the program that already exists. (Con., Dec. 1, 1992)

Connections and balance

When Bonnie and I had our first conversation in October, she informed me she had been working part time since becoming a mother eight years ago. This was the first indication I had that her life as a teacher was strongly connected to her life as a mother.

The intensity of these ties became apparent to me somewhat later when I got to know and understand how Bonnie made connections in her life. A short time after our work began, I realized that Bonnie's priorities were set in connection with her child's needs.

I recall the first two weeks in Bonnie's classroom when I was anxiously seeking time with Bonnie. As a researcher, I had envisioned long sustained conversations taking place during lunch break after each morning I spent in the classroom. For Bonnie, lunch break was a time to have lunch with her son. Bonnie valued their time together and was not ready to compromise this time for the research. This would have disturbed the balance Bonnie tried to keep between her life as a person and a mother, and her life as a professional. As much as I was anxious to spend that time with her, Bonnie was anxious to share that time with her son. She was always racing to get to his school on time.

The more I came to know Bonnie, the more I understood the impact motherhood had on her life as a whole and on her life as a teacher. It was not only the conscious decision to give up a full time position for a part time one. Motherhood added a new dimension to her life. The intensity of her feelings were expressed daily in her interactions with her students and their parents.

> I would get flashes when I was out on supervision and some child would fall and hurt himself. And it would just hit me this could be my little boy. (Con., Dec. 8, 1992)

Not only physical pain but all students' needs and struggles were viewed through her eyes of a mother. "When I see a child in need in the classroom struggling in some way I think this could have been my little boy" (Con., Dec. 8, 1992). Bonnie was also extremely sensitive to the feelings of the parents.

> When I see a parent come into the door, very upset and concerned over a situation, I think this could be me at the door and it certainly gives me extended empathy and understanding. (Con., Dec. 8, 1992)

Bonnie's image of being a teacher was nurtured and enriched through her experiences of mothering.

Making connections was a theme woven into Bonnie's work as a teacher. They extended beyond motherhood, be it connections with events, people, or emotions. Connections came across through the themes Bonnie chose to use in the classroom and in the manner she tried to make those themes meaningful to her students. Bonnie chose themes that were inspired by the curriculum guides. The curriculum, however, was not the only source of ideas and themes for her work.

> All my work is my choice but my guidelines come from the curriculum. I interpret the curriculum the way I want to teach it. (Con., Dec. 8, 1992)

It was Bonnie who made choices guided by the curriculum. Bonnie also wanted children to have a say in the programs. She talked about having children build part of the program by themselves.

> I am really encouraging the children to be spontaneous and to build the program themselves and for me to build around that, rather for me always directing them. (Con., Jan. 14, 1993)

Bonnie described her methods for teaching writing as partly using pre-prescribed "short lessons" or "incorporating mini lessons ... about a sentence, a paragraph, or the difference between a list and a paragraph". But Bonnie also tried "to pick up on what they are doing" (Con., Nov. 19, 1992) and incorporate it later into her work. For example:

> Alex had a story with a beginning, a middle, and an end and we didn't talk much about it. But we are going to talk about it more tomorrow and Monday, to try to get the students to think about a beginning, a development and a conclusion in their stories. (Con., Nov. 19, 1992)

Sometimes Bonnie picked up on students' ideas on the spot and went along with them.

> The reason we did "I love" stories today is because Fay had written this lovely little book called "The love book" at home ... I threw it out as an invitation and that's what I like to do, build up enough comfortableness and structure in the writers' work-shop that we can throw out invitations and write little books based on a sentence or two. (Con., Nov. 19, 1992)

While in some ways each classroom can be seen as a small island within the larger community, Room 10 was not an isolated island. Bonnie and her students were well-integrated into their school community. They reached beyond that immediate community to connect with other people and places. There were a number of ways in which Bonnie and the students interacted with events and people around them. They shared their work with students and other members of the school and sometimes with people outside of their school.

Bonnie was a driving force in connecting the community to their school. Members of the community were active as volunteers in the school's activities. When I was part of Bonnie's classroom there were three volunteers in the classroom on different days. They shared their time and skills with the students.

In many ways Room 10 was a microcosm of the world. Seasons, holidays, and special world events were an integral part of the students' daily experiences. Not only familiar holidays were acknowledged and celebrated. Bonnie called her students' attention to less familiar events such as the Ukrainian Christmas. On January 7 the message acknowledged the special day. It opened with "Happy Ukrainian Christmas" and was followed by a conversation on the special day. Bonnie took advantage of my presence in the classroom. As a foreigner in Canada, she felt it was a good opportunity for her students to connect to a distant country. Bonnie asked me to tell her students about my country and to share pictures and experiences with them. Her holistic sense of what school experience should be was expressed in her request to have me share the story and customs of the Hanukkah holiday just before Christmas. Although Bonnie was pressed for time before Christmas, she made time for the Hanukkah celebration because she believed it was important for the students to connect with the world at large.

Many daily events were interconnected with the children's experiences. Students were partners in the teacher-parent conferences. They were involved in preparation for those nights and were asked to share their thoughts, feelings, and impressions following those events. One morning after such conferences with parents and students had taken place, Bonnie assembled the students on the carpet and asked for their impressions of the previous night. "Did you enjoy it? Who thought it was fun?" (F. N., Nov. 17, 1992). Students were encouraged to express their feelings about that evening.

When I came in one morning the message board related to a behavioral problem. The message read:

> We had some problems during shared reading. I hope they will be solved shortly.
> love Miss ____ . (F.N., Nov. 19, 1992)

Bonnie and the students discussed the events that took place a day earlier during shared reading and came up with some rules concerning their behavior during shared reading.

> In shared reading we need to read with a quiet voice; Read, not talk and do silly things; Be good role models for others; Read from the pocket chart but don't change it; Find a quiet place to read; Read with one or two friends (F.N., Nov. 19, 1992).

Those rules were discussed to remind the students of proper conduct during shared reading. They were not put in writing, except in my field notes.

On the day before Bonnie was to participate in a meeting among teachers and authors, she discussed the event with her students. She shared information about the purpose of the meeting, its place and why she felt it was a worthwhile experience for her. "I get to go tomorrow to listen to authors ... I get a chance to learn to be a good teacher" (F.N., Nov. 5, 1992).

It seemed natural for Bonnie to make the new experience of teaching with computers into a connected experience for herself and her students. She incorporated teaching computers into her Language Arts program. "It's integrated in the learning that's already taking place. It's not a goal on its own" (Con., Dec. 1, 1992). From the start students came to know the computer experience as another dimension of their writing experience. Bonnie viewed the experience as an extension to the reading and writing process.

When the second computer was added to the classroom, Bonnie used the occasion as a topic for their daily message. Simultaneously it became an object connected to their reading and an event worthy of a moment of celebration. That morning the message read:

> Have you noticed what's new at our computer center? We have now two computers!
> Love Miss ____ . (F. N., Jan 7, 1993)

The machine that was brought into the classroom sometime before Christmas was acknowledged, valued and celebrated. Bonnie wanted her students not only to acknowledge the presence of the computer in their room but also to acknowledge that it had been the effort of the school principal that made a second computer possible. Thus, the message had one more part to it: "P. S. Say thank you to Mr. ____ " (F.N., Jan. 7, 1993).

During the time I spent in Bonnie's classroom observing her and talking with her, I felt Bonnie was attempting to balance her roles and priorities in life. Bonnie tried to balance motherhood and teaching, two compelling parts of her life. Bonnie also tried to balance her overall program with the added computer program. She sought ways to achieve excellence for herself and the students without being rigid and without imposing her authority on the students. Living within a web of connections and continuously striving for balance helped her make sense of her work as a teacher. I believe it also supported Bonnie's journey into "discovering" the value of computers.

Perfectionism

For many Education students, it is usual to assume a teaching position following graduation from university. Bonnie, however, did not follow this path. When she graduated, she was offered a teaching position but she turned it down. Instead, she asked to be placed in a school as a teacher's aide. What made Bonnie deviate from the expected route? Bonnie said she felt the university experience had not prepared her adequately for teaching.

> I chose not to (teach)... I didn't feel qualified ... because I felt university had not prepared me adequately for the teaching profession and I just said I'm not going to do that to those children. It's not fair to them to have me as a teacher. (Con., Dec. 8, 1992)

Bonnie's perception of teaching and her struggle for excellence and perfection seemed to play a crucial role in her decision to turn down her first job offer until she felt able to teach. She was not about to compromise on her understanding of what it meant to be prepared properly for the teaching profession. When I brought up my interpretation of these actions as reflecting her struggle for perfection, Bonnie said, "that's right". When I asked Bonnie to explain how she thought about perfection as a teacher she said:

> I think in my work it's a case of wanting to do just the best that I can do for the children. (Con., Jan. 21, 1993)

The meaning Bonnie made of "wanting to do just the best that I can do for the children" was all-encompassing. It meant spending long hours planning and preparing; it meant thinking of every possible detail; and it meant reaching out to gain more knowledge and insights from a variety of sources.

Usually, Bonnie arrived at school around seven o'clock. At times she would have already spent from 5:00 a.m. preparing for the morning activities. When Bonnie planned a unit or a program she did it thoroughly. She liked to research issues by reading related materials.

> Oh (I read) lots! Much more then I ever did. Yeah, much more now than I did when I first started to teach. I read mostly books on language learning that's where I read most of my stuff but then that's what I'm teaching, being half time. (Con., Dec. 1, 1992)

Although Bonnie said that sometimes she liked to "fly" with things that developed, and I observed her doing so, in most cases she chose to be well prepared and to have control over what would happen in the classroom. "I always have my ground covered ... I don't leave anything to chance" (Con., Jan. 14, 1993). For example, during Hanukkah celebration in her classroom I offered to cook potato pancakes with the students. Two evenings before that activity took place Bonnie called me to discuss the final plan for that activity. Every detail was well planned and every possible ingredient and utensil was discussed. We also wrote all the details down.

When the second computer was placed in the classroom Bonnie did not make use of it right away. Bonnie wanted to provide a proper environment for using the computer. She wanted it on its own table and wanted a space for it near the first computer so as to form a computer center.

> I just wanted to get it up, set up properly. I envisioned them being side by side so it could be a computer center rather than have two areas, and I really

> didn't want to put two computers on one table, it would have been just too crowded ... I think it's important in the classroom, you know to me the environment, the way you have things set up, and the accessibility to materials is very important. (Con., Jan. 21, 1993)

Bonnie waited for the right environment but she also waited for the proper timing. The period before Christmas when the second computer arrived was a very hectic time for Bonnie and the students with both the Christmas and Hanukkah celebrations. Bonnie decided to wait for a better time after Christmas vacation. The second computer was put to use two days after the Christmas break. The proper environment was set; the timing was right; the computer could receive the attention it deserved.

Perfection was also what Bonnie expected of her students, that is, high standards but not absolute perfection.

> Not to set too high of a goal for children that are going to be frustrated and then make them feel bad about their abilities to learn. But one instead that's going to encourage them to feel good and to want to risk more and to go, and to go in short steps and you'll get them to go further ...you know one that accepts every individual as truly an individual. (Con., Dec. 1, 1992)

Bonnie's reflections

Toward the end of January, Bonnie and I had our "final" conversations. Even though we had other conversations later on, I considered the conversations in January to be "final" because I had decided it was the right time for me to complete collecting data as a researcher. I stayed until March in Bonnie's classroom helping the children once a week with their work on the computer. I no longer saw myself as a researcher in the classroom.

The two final taped conversations turned into a time of reflection for Bonnie. Two main issues came up in these conversations: the initiation of the research project and Bonnie's experiences with teaching computers. The former issue is discussed in chapter 4. The latter came up when I asked Bonnie to describe her journey with computers from its initial stages. Bonnie described her beginning as an illiterate in computers.

> I basically started as an illiterate, with no experience and no desire for any experience on the computer. (Con., Jan. 14, 1993)

She went on describing how she felt some months later.

> The journey from, like I say, illiteracy to a feeling of comfortableness with the programs that I'm using, it's a long way, I think, it's a long way. (Con., Jan. 14, 1993)

Bonnie said that she no longer felt illiterate with computers with regard to operating a computer in general and with regard to particular programs.

> I would say that I'm literate in the computer programs I have chosen to use, but I have no (laughs) ahm, qualms or whatever about admitting that I do not know very much about the computer, I only know something about what I've chosen to use. (Con., Jan. 14, 1993)

Bonnie really felt comfortable with the programs she had chosen to use. They fitted her needs, but she did not perceive herself as an expert. Bonnie added that for the rest of the 1993 school year and perhaps for the following school year she was satisfied with the programs she was using both in the classroom and for her personal needs. She felt the programs answered the goals she had set for herself for the 1992-93 school year. Bonnie did not intend to add new programs to the ones she was already using unless her needs changed.

> Actually even for the next year in my life, I'm not so sure I'm going to add that many new programs because I think these ones are good, ... I have chosen sound programs and I think that they are very appropriate for my needs. And as my needs change, then I will obviously look towards other kinds of programs. (Con., Jan. 14, 1993)

Bonnie commented on the importance of using the computer as part of her Language Arts program. When I reminded Bonnie that at the beginning of our work together she had wondered whether having a computer lab would be a preferable way of teach with computers, she said that she wondered about it at the time because she was aware of the trend by many schools to adopt a computer lab approach rather than having single computers in classrooms. After her experience, Bonnie was convinced that having a computer, or computers, in the classroom with free access to them at all times, was the best way to make the computer experience a meaningful one for the children and the teacher.

> I wondered if it was because I know many schools were going that direction ... I wish they put more computers in the classrooms ... It's there all the time and because it's already part of what the rest of the children do. (Con., Jan. 14, 1993)

Bonnie felt quite strongly about what she considered to be the preferable way to incorporate computers. It became a sensitive issue for her when her son's school was about to decide the issue. Bonnie attended a parents' meeting in which the issue of installing a computer lab was discussed. Her immediate reaction was "oh, no!" Bonnie intended to discuss her view and experiences on the matter, in private, with the principal of that school. I thought Bonnie had moved from a somewhat passive encounter with computers to taking a stand on the matter and trying to voice her views and experiences. This story seemed to further illuminate the connections Bonnie made between her life as a mother and her life as a teacher.

Bonnie viewed the computer experience as a "very positive" one for her students. She believed it encouraged them to read and write more. She reflected on what they had experienced.

> I noticed Jill reading over all her old stories today and trying to see if one of them was worth publishing, and Ann wanted to publish. I've got two notes there from Sharon and Ann, so I think that that's all indication of the positive attitude. (Con., Jan. 21, 1993)

Bonnie thought that most young children who had computers at home used them mainly for playing games. She felt using the publishing program offered her students an opportunity to be exposed to another dimension of computers. The publishing program appeared to Bonnie to have been a good way to achieve that goal.

> They use computers at home for a different purpose, and ahm, they mainly play games on the computer or Nintendo, or whatever they happen to have, and they don't view it as something to publish with. (Con., Jan. 21, 1993)

In a concluding reflective note regarding the use of computers in schools, Bonnie touched once more on an issue she discussed a number of times earlier. She suggested that the possibility that using computers might enhance her work as a teacher was a major reason she decided to incorporate a computer in her teaching. This long quest to become a better teacher directed Bonnie toward embarking on teaching with computers. Bonnie described her reason:

> Becoming a better teacher or doing something better for the students, Yes. That's the main reason. (Con., Jan. 21, 1993)

Many times during our conversations Bonnie had talked about the support and help from friends and administrators she had received as a teacher. Bonnie was grateful to these people and appreciated their help and support. While reflecting on her experience with computers, she raised the issue once more. She connected the trust and direction she had received from colleagues, friends, and administrators to both the decision she had made to employ computers and to the valuable and positive experiences that followed.

> I have had good direction from people who I trust and I have chosen sound programs and I think that they are very appropriate to my needs. (Con., Jan. 14, 1993)

Bonnie brought up a very personal issue in our final conversation. She reflected on my presence in her classroom. In so doing, I heard and felt a personal outcry which I believe also is an echo of other teachers' cries. It was a painful and sincere expression of hope and a wish to be able to step out of the isolation of teaching, to have her stories heard. Although Bonnie acknowledged and valued the support and trust from administrators and colleagues still, I sensed Bonnie's feeling of isolation in her daily work in the classroom. This feeling of isolation according to Bonnie had been broken for a while during our work together.

> It's been very valuable to have somebody who could come in regularly. Who was trained, and knowledgeable and who could give you feedback. You feel very isolated at times in the classroom, as you well know, there are times when you just cry for some feedback, you want desperately to get an idea whether or nor you are doing something valuable, and whether or not you are interacting in a positive way with the children. All those kinds of things. And I think that that's a great value in having anybody in, especially another teacher. (Con., Jan. 21, 1993)

Bonnie was thankful and appreciative of the opportunity she had to be able to share her thoughts, feelings, doubts, and wonders. She was grateful to have had a chance to reflect on what she was doing. For Bonnie, and probably for many other teachers, reflecting was a rare experience.

> It is very much a way of reflection. I had really intended to do some writing and reflecting and I just never got to doing it ... Even though you said your

> role is to come and observe me ahm, you've just dug right in there and been an assistant whenever there was need for assistance with the children in any way. And I have valued that help, it's ahm, made my job so much easier this year. But it's also helped me to learn ah, because it's freed me up giving me the extra moments to be open and ready to learn to be ah ... not so demanded upon that I couldn't learn, ah, we would have gotten here by June but we would have never gotten here by January without your help. (Con., Jan. 21, 1993)

For Bonnie, and for me, a further expression by which Bonnie acknowledged the meaning making of the computer experience, came through a reflective note Bonnie prepared for the principal of her school. Bonnie had written this reflective note in January. I asked for and was given Bonnie's consent to obtain and use the following document.

> Personal Goals -- January reflections 1992-93:
> To increase level of confidence about the use of the computer, both in the classroom and personally.
>
> I feel that I have made incredible gains in both of these areas in a very short while! Beginning this fall as a more or less complete illiterate on the computer, I was not even sure if I wanted to accomplish this goal! Previously, I had always resisted the computer (and much other technology as well) -- it was a conscious choice in my life NOT to become involved with machinery! Alas, the famous APPLE IIGS entered room 10! I do not know who asked for it (it certainly was not me), but it's presence perturbed me. It perturbed me in that it got me moving. I have far too much personal pride to see an expensive object sitting, unused, in a corner of the classroom -- especially one that the children kept asking about! Much as I tried to ignore the computer in my own life, I realized the tremendous impact it had made on the lives of the rest of society, not to mention children! So, this is what motivated me to choose this goal to peruse in 1992-93.
>
> My own level of personal confidence has reached the point that now, anything that I CAN do on the computer, I DO on the computer! It has been a great resource for the creating of newsletters and teaching aids. The first newsletter took me three hours, just to get the first draft done -- It caused me tears and frustration when I thought that I "lost it" and would have to begin again. After much cutting and pasting, it was finally finished! My feelings of resentment as to "why did I choose THIS goal?" bubbled very near the surface, and I felt ready to blow!! However, amazingly enough, each ensuing "creation" became easier to accomplish. I am now giving serious thought to writing progress reports on the computer. WOW!!
>
> Even if my personal gains via the computer were non-existent, the rewards of working with it in the classroom would make this goal worthwhile. Having children publish final copies of their own writing on the computer has created memorable moments, not only for the students, but for myself as well. Writing workshop is a part of our daily life -- the fact that the computer has become part of that routine has made it even more exciting and motivating than before! I have been very fortunate to have had assistance and expertise shared so willingly with me from Haya Lachman, a university student presently working on her Master's degree in Education. Because of her presence, the students have had more opportunities to work on the

> computer, and they have been taught skills in a knowledgeable and sensitive manner. At this point, three adult volunteers have also had some experience working with the students and assisting them in the keyboarding of their written product. The students don't want to get off the computer when given the choice! Some children who have great difficulty writing their own thoughts have persisted in writing, and then amaze me with their diligence at the keyboard! The level of enthusiasm in the class is contagious -- the computer has helped to create many positive experiences!

This report expressed an acknowledgment of a positive journey with the computer for both Bonnie and her students. The message that this experience was valuable and rewarding came through loud and clear.

In May I brought back to Bonnie the narrative account I had written. Bonnie responded both orally and through the following note:

(May, 1993)

> In her thesis, Haya wrote what she called "Bonnie's story" - a story about me as a teacher. Reading this story touched me in a personal and almost intimate way, and it is worth reflecting on.
>
> Reading about one's own story through someone else's eye is an enlightening experience. Although I recognized anecdotes and recalled quotes used, and although my beliefs were written in black and white, I couldn't quite believe it was me that Haya was writing about! Many of the items she presented reflected what I have been TRYING to achieve - they reflect strategies that I have read about and strived for. Haya is a professional with a knowledgeable eye, and she was in our room many times - hence, I should trust her comments as being accurate. However, part of me couldn't help but say, "I fooled her! She only saw the good side of me as a teacher. I guess she never came on a bad day!" This says a lot about my perception of my own teaching qualities. The image that you present to others is not necessarily what you are feeling inside. The daily stresses of managing a classroom and making multitudes of decisions can sometimes overshadow the celebration of learning that has gone on. One of the themes that Haya noted on a recurring basis was titled "perfectionism". My tendencies towards perfectionism have helped me to achieve certain goals, and "wanting to do what I can for the children" is part of that. However, that same trait drives me to wanting more, and admittedly, to not taking time to celebrate my own daily achievements. As Haya wrote, celebrating goes on constantly in the classroom in a variety of ways, all geared toward helping students feel better about their learning and about themselves as individuals. If I as an educator believe this to be a vital part of daily living, should I not then be living this in my own life? My growth in confidence alone is worth a hundred celebrations! And yet, in this busy world of hustle and bustle, I get going at such a pace that I forget to stop and take time for my own celebrations. Haya referred to "connections and balance", something she perceived me as striving for. Because I work part-time hours and attempt to balance my life as a mother with that as a teacher, because I schedule my time according to family as well as school needs,

> because she observed me weaving mothering and teaching issues, she sees me having a balanced connected life. On reading my story, I felt it reflected my beliefs, but I was at the same time feeling rushed and overworked and very much UNbalanced and UNconnected! In all, reflecting on what Haya wrote, I am grateful to have shared with her and to have received valuable input about my beliefs and how they are put into action. More overwhelming, however, are my feeling of humbleness and a desire to keep trying to provide the best for my students, while at the same time achieving what is good for me.

At the time when Bonnie wrote this reflective account after reading her story, she also wrote a reflective note to her principal about her experiences with computers and with taking part in the study. With Bonnie's permission I bring an excerpt from it.

> My own level of confidence increased daily, along with the students' confidence. Their enthusiasm motivated me! I approached each new stage cautiously, as I always do, and ensured that I had practiced my skills enough to be able to demonstrate for and to coach the children. Haya was an invaluable source of support for all of us! She encouraged us daily as she entered our room with a smile, eager to hear students read their work and to assist them on the computer. She provided us with positive feedback in a gentle and caring way. She was sensitive to my needs to progress in this adventure at my own, comfortable speed and to "take on" only what I thought I could handle at any given time. She provided me with the opportunity for many professional and personal conversations, which teachers often don't have time for. I was able to reflect, verbally, on our progress on a weekly basis. Occasionally she would remind me "from where I once came a virtual illiterate on the computer", and in that, would help me retain perspective with regards to this goal and my students' development. Having Haya in our room was ideal - a chance of a life time! However, there came a time when she had to return to other commitments. Prior to that, I trained volunteers to assist with our publishing program. They expressed to me some concern over feelings of inadequacy in dealing with computers, and then it was my turn to say, "it's very basic, simple really and you will catch it in no time at all!" What a switch around! These dedicated volunteers have now become an important part of our class - the children look forward to them coming and STILL want their time on the computer! How far we have come together!

CHAPTER SEVEN

Discussion

In this study I was interested in the meaning experienced teachers made of beginning to teach with computers. Paraphrasing Richert's (1993) question, I asked how do teachers think about their computer experiences in a context that can be unfamiliar and beset with problems? I was interested in Kathy's and Bonnie's actions, feelings, thoughts and impressions regarding their experiences with using and teaching computers for the first time. My work with Bonnie and Kathy revealed and highlighted some issues involved in their encounter with computers.

In trying to capture Bonnie's and Kathy's computer experiences, I felt as though I was trying to "isolate" a particular part of their lives. But Bonnie's and Kathy's experiences with computers were not isolated experiences. Rather, their computer experiences were nested within their individual life histories as persons and as teachers. Their stories told from the perspective of their computer experiences were interconnected with the stories of their lives as wholes. I attempted to focus on Bonnie's and Kathy's encounters with computers as *they* experienced them, sympathetically and, as far as possible, in their own terms (Elbaz, 1987; Connelly & Clandinin, 1988).

It was evident from the start that the journeys Kathy and Bonnie had with computers were different. When I planned the research, I anticipated that they would have different experiences. However, the extent of the differences in their experiences surprised me. Nonetheless, some similarities were also apparent. The differences in Kathy's and Bonnie's experiences stemmed partly from the different contexts in which they taught computers but were also influenced by their personal practical knowledge, held and used, in these contexts. The different contexts in which Kathy and Bonnie taught computers reflected each school's philosophy and the school's organization concerning the placement and scheduling of the computers.

Kathy taught in her school's computer lab for one scheduled hour per week. The lab was part of the school's main building whereas Kathy's homeroom was located in a portable detached from the main school building. During each computer class that took place in the lab Kathy was surrounded by her 21 students and 19 machines. This was a situation that could have been threatening to any teacher and particularly one new to teaching with this medium. Indeed, for Kathy the computer lab turned out to be a disconnected, and at times, "unsafe" place.

Bonnie worked in a very different context. She taught with a computer in her homeroom. She started with a single computer that had been placed in her classroom. Having a computer in the classroom was the first step in making computers part of the students' and Bonnie's lives. The placement of the computer in the classroom allowed Bonnie to exercise some autonomy in deciding on the proper timing and pace for teaching computers, a pace and timing that suited her and the students' needs. It was obvious that the different teaching contexts played a major part in determining Kathy's and Bonnie's experiences of teaching with computers.

Notwithstanding the differences in context and the different ways in which Bonnie and Kathy held and used their personal practical knowledge in teaching with computers, some commonalties emerged. First, their beginnings were similar. Bonnie and Kathy began to teach with computers in the school year of 1992-93. They both perceived this time period to be their first encounter with teaching with computers. I would like to use the term "encounter" in the sense of being more of a confrontation than an accommodation (Bollnow, 1972). This view of the concept "encounter" is suggested since the computer "shakes us, and increases our awareness, making us more sensitive to ourselves, preparing us for the new" (Howard, 1991, p. 19). The term "encounter" in this sense seemed appropriate to describe the way Kathy and Bonnie thought about computers, at least in the initial stages. Indeed, they perceived computers to be an innovation for them. They viewed the journey taken with computers to be an innovative experience and a process of change in both their personal and professional lives. The decision to use computers demanded an examination and re-evaluation of their attitudes, needs priorities and practices.

Kathy and Bonnie described a long period of evading and resisting computers. Some of the literature on innovation and change in education suggested that teachers have a "built in resistance to change" (Lortie, 1975); express "deep-seated conservatism" (Cuban, 1984); or "inherent conservatism" (Ognibene, 1989). McLaughlin and Marsh (1978) and Cuban (1986) report that change is more difficult to bring about with experienced teachers. In my view, these studies imply that teachers are either incapable of evaluating and making decisions about their professional needs or that teachers have no right to do so. Either way, teachers' "avoidance" or "resistance" to employ an innovation according to the studies mentioned above, is perceived in a pejorative way.

To my mind, what Bonnie and Kathy described as "resistance" to computers does not reflect a trait inherent in their teaching. Rather it reflects their lack of conviction in computers' educational potential. I suspect their use of the term "resistance" was influenced by the prevailing use of this term concerning teachers' practices. Change was very much part of Bonnie's and Kathy's professional lives. Their actions and stories manifested a philosophy and a practice of continuous change in their work as teachers. Sometimes the change they experienced could have been described as "hidden change", that is, the kind of change that does not get noticed outside their immediate classroom environment. Other times the change was overt and explicit. Hence, it appears that the resistance that Bonnie and Kathy referred to, regarding computers, calls for a different approach, a different interpretation, and a different understanding than the ones offered by researchers cited above. Apparently Kathy and Bonnie resisted the computer because at the time they saw no need for computers in their practice. Bonnie and Kathy exercised the "practicality ethic" (Doyle & Ponder, 1977-78). They also questioned the value of computers to enhance their teaching and the students' learning. This view concurs with Erickson's (1988) findings that teachers' perception of an innovation is strongly influenced by "values inherent in the innovation", that is, teachers view an innovation favorably if they perceive its value to be congruent with their values. As long as the value of computers was questionable to Kathy and Bonnie, they avoided their use. Moreover, Kathy and Bonnie avoided computers because each of them felt that using computers in their teaching would *interfere* with their existing priorities (Fullan, 1982). Thus, values, needs, timing, and context appeared to shape Bonnie's and Kathy's decisions with regard to using computers in their teaching. This was much the same as with their other practices and change experiences as teachers.

When Bonnie and Kathy first decided to use computers in their teaching they thought about the computer as part of their ongoing Language Arts programs. They regarded reading and writing to be among the most important aspects of students' learning as well as their teaching. Hence, computers became part of their Language Arts programs. In Bonnie's classroom the computer became an integral part of the Language Arts program shortly after the computer was introduced into the program.

Kathy realized after a short time that her original plan for using computers needed to be altered. Using the computer for writing and publishing students stories' turned into a frustrating experience due to insufficient computer time. The single computer that was placed in her classroom for a short while did not seem to help solve the problems they encountered in the lab, because it operated on a different kind of disk than the computers in the lab. This meant having to transfer work from one kind of disk to another each time students used the computer. Consequently, the computer in Kathy's Language Arts program was not afforded a great deal of importance.

Kathy's and Bonnie's stories tell of different experiences they had with encountering computers. I would like to take a view offered by Elbaz (1983) and Connelly & Clandinin (1985). They suggested that teachers use their personal practical knowledge in their daily practices within the contexts in which they work. The observations, conversations, as well as other field texts (Clandinin & Connelly, in press), and the narrative themes that emerged from the analysis, suggest that in their attempts to make meaning of their computer experiences, Bonnie and Kathy drew upon their personal practical knowledge. Both called upon their past experiences, their instructional knowledge, their knowledge of the milieu, their knowledge of their students, and their knowledge of themselves.

Bonnie cautiously approached the innovative experience of teaching with computers. She planned, experimented at home, and gradually incorporated the first computer into her teaching. Initially, she used it only with her year two students. Only later, after evaluating the experiences year two students had, did she use it with the year one students. Bonnie's approach was directed by her need to feel "intact", and in control of situations rather than "all over the place". Her approach to using the computer was also guided by her wish "not leave anything to chance". Bonnie's cautious planning was similar to the way she prepared everything else she taught. Her careful planning helped Bonnie keep a balance between her life as a teacher and her life outside of teaching. To maintain balance between different activities in her classroom Bonnie used "rules of practice" (Elbaz, 1983). Elbaz defines rules of practice as short, clear statements created to deal with recurrent situations. Rules of practice are one way that personal practical knowledge is held. Bonnie used this aspect of her knowledge to help her deal with the conflicting demands of scheduled activities and demands for her attention.

Bonnie's educational philosophy was expressed in her daily actions. According to her philosophy, it was her responsibility to offer opportunities to students and to do the best she could for them. It was this philosophy that guided her when she first decided to use a computer. Later on, this philosophy led her to seek out a second computer after she assessed the students' experiences with the computer to be worthwhile. The knowledge of her students' needs as well as knowledge of her own needs and limitations guided Bonnie to seek help with the computer from me and from volunteers. She started with one computer and used one simple program. This enabled her to control the computer experience and to channel it in a way in which she felt comfortable (Martin, 1988). It was then she decided it was time to ask for a second computer. This practice resulted in what Bonnie saw as a positive and rewarding experience.

Kathy's approach in handling the innovative situation of teaching with computers was different. It could be described as "plunging into" the computer experience. Kathy's knowledge of herself and her knowledge of her students led her to embark on the computer experience by attempting to make it a collaborative endeavor with her students. She neither perceived herself nor expected her students to perceive her in the image of "teacher as expert" (Britzman, 1986) on the issue of computers or in any other area of teaching. She viewed herself and her students, as teachers and learners, engaged in a learning experience. Kathy called upon her personal practical knowledge, especially her style of "improvisation" (Bateson, 1990), her humor and a form of "joking relations" (Radcliffe-Brown, 1940) to help her teach with computers.

Usually when Kathy planned she used outlines and sketches "thinking out" her plans. Much like jazz musicians she used improvisation to tie in familiar aspects of situations while responding to new ones. Kathy used improvisation in her daily practices in the classroom. She appeared to hold "conversations with situations" (Schön, 1992) on the spot. She perceived improvisation to be challenging for her and the students and saw it as opening possibilities for creative "surprises". However, it appeared Kathy called upon that aspect of her personal practical knowledge more often in the computer lab. In that complex context, Kathy improvised on the spot with the collaboration of her students. It helped her deal with what she considered to be "unfamiliar territory". Kathy called upon this part of her personal practical knowledge to make sense of many situations which were new and were many times unpredictable and complex.

For Kathy, the computer lab was at times an "unsafe" place. One of the ways in which Kathy coped with the computer experience under such circumstances was to use another part of her personal practical knowledge, humor. She personified the machines, and addressed them as human using humor and "joking relations" (Radcliffe-Brown, 1940; Dwyer, 1991) with the machines as well as with the students. Her use of humor and "joking relations" with students and computers added a humanistic, more personal, aspect to the computer experience. It also helped her simplify the complex situation, deal with uncertainties and ambiguities, and make the atmosphere in the computer lab informal and less tense.

A striking difference between Bonnie and Kathy emerged regarding the process of evaluating the computer experience. After using the computer in her Language Arts program, Bonnie evaluated the experiences of her students with computers as stimulating and as encouraging their writing and reading. Bonnie also found a number of ways in which she personally could use the computer to her advantage in her work as a teacher. Once the value of computers was established for her, the computer became an important part of both Bonnie's and the students' activities. It also turned into an integral part of their classroom activities. She was excited with the students' and her own progress with handling and using the computer and expressed a sense of accomplishment and success. Bonnie no longer questioned the value of teaching with computers.

Kathy, on the other hand, went on questioning the value of computers throughout our work together. Kathy and her students experienced moments of success and enthusiasm as well as moments of frustration and disenchantment. Kathy valued her personal experiences with computers but she remained unsure about their value as a tool for teaching in elementary school. On some occasions she wondered if the enthusiasm with which computers entered many schools reflected mainly the views and interests of agencies outside the educational system. She also wondered if this enthusiasm with computers does not point to a shift from an emphasis on thoughts and ideas toward idolizing a particular technology for its ability to process information and for its flashy outputs. Kathy's questions reminded me of Roszak's (1986) view. He claimed, in an analogy with the tale about the emperor's clothes, that the computer has been overdressed in fabulous claims. It appeared to me that, in Kathy's experience, the computer was yet to become "trustworthy".

Kathy and Bonnie wondered about, and questioned, the value of computers before they decided to use them in their teaching and after they started to use them. In so doing they went through a process of "reflection in action" (Schön, 1983). According to Schön, it is a process which practitioners use in uncertain situations. A practitioner thus becomes a researcher in a given context re-framing and restructuring the unique situation rather than depending on established theories.

What does it mean for experienced teachers to begin to teach with computers? Bonnie's and Kathy's experiences with computers and the meaning they made of those experiences were embedded in the narrative unities of their lives (Connelly & Clandinin, 1988). Those experiences were an inseparable part of their personal narratives; of their past experiences, their present thoughts feelings and actions, and their goals and intentions for the future (Connelly & Clandinin, 1988). Thus, generalizations and prescriptions do not seem to be an answer. Given that circumstances are so diverse it is not possible to generalize for all situations (Cunningham, 1986; Richert, 1993).

What does it mean for experienced teachers to begin to teach with computers? It meant different things to Bonnie and Kathy. However, they both tried to make meaning of that experience calling forth their "practical knowledge" (Elbaz, 1983), their "personal practical knowledge" (Connelly & Clandinin, 1985), their "professional craft knowing" (Brown & McIntyre, 1986), their "wisdom of practice" (Shulman, 1987), within the unique context and situation in which they worked. The "orchestration" (Woods, 1987) of the variety of areas of knowledge that came "on call" in each given context helped Bonnie and Kathy make meaning of beginning to teach with computers.

Reflections

For me as a researcher, the study brought into light some issues and questions rather than answers. It seems to me that when individuals encounter computers we should expect a range of experiences. It is also expected, therefore, that such encounters will result in dramatically different consequences for different individuals (Turkle, 1984; Salomon & Gardner, 1986).

My experiences in the work with Kathy and Bonnie illuminated the individual ways through which they used their personal practical knowledge to handle their new experiences of teaching with computers. It was evident that Kathy and Bonnie had very little input, if any, into the decisions and the processes regarding the introduction of computers in their schools. In my opinion a true partnership in the educational decision making process with regard to computers, as well as with all innovations and change, ought to allow teachers to voice views and concerns on the matter. Teachers active involvement is needed. My view is that teachers have lived long enough with change to have a stance in the matter. I find it hard to comprehend that it is still possible for a teacher to "find" a computer in her classroom without her being part of this decision. We need to consider a change in the way teachers are sometimes perceived and portrayed, that is, as a unified "body" of practitioners. In books such as "Schoolteacher" (Lortie, 1975) and "How Teachers Taught" (Cuban, 1984), teachers have been subjected to research, in order for them to reveal information about the uniform characteristics of their teaching. I am reminded of the concept of "stereotypic construct" (Bussis, Chittenden & Amarel, 1976), with which teachers were regarded. This stereotypic construct constitutes a view that "fixes its elements into a predetermined set of other constructs" (p. 18). It appears to me that this construct does no justice to teachers. The "personal construct" is a more appropriate way to describe what teachers do. It is "a personal construction or representation of some aspect of reality that is the result of an individual's interpretation of his world" (Bussis, Chittenden & Amarel, 1976 p.16). Suggested here is an image of teachers as activists, as constructing something rather than only responding to something. In light of this view personal constructs are the means by which teachers, as well as others, predict and anticipate events. They are also used to make sense out of new situations that teachers encounter.

Recently, a growing number of studies have begun to look at teachers' individual experiences and to illuminate teachers' diversities. There are common threads noticeable about teachers' first encounters with computers but each individual, as was the case with Kathy and Bonnie, weaves her own unique fabric. It is from this point of reference that I wonder if we can still think about teachers with the notion of "sameness"? Is it possible to think and plan teacher education and professional development as a prescribed, handed-down package? I strongly disagree with Cuban's (1986) claim that for teachers to learn the new they need first to unlearn. I think we ought to consider the wealth of teachers' knowledge. It is teachers' strengths not their deficiencies in which we ought to be interested (Brown and McIntyre, 1986). I believe that teachers are intelligent, knowledgeable, and responsible individuals. Their knowledge is expressed in a variety of ways, in diverse situations and at different times. Based on my own experience as a teacher, and the research I have done, I suggest that teachers' involvement in the process of any form of change is crucial. I believe that teachers, given their knowledge and experience ought to be the ones to assess, and to decide on the proper time, manner and pace in which they would choose to introduce and use computers or any form of change and innovation. With this in mind I would like to call on all parties involved in designing professional development programs to consider the wealth of teachers' knowledge and the potential of classroom inquiry by teachers. It is an invaluable source of knowledge that can no longer be ignored.

I believe that computers are still an innovation for many teachers. The use of computers is taken for granted especially by the young who are socialized into a world in which the computers are part of life much like pens and pencils. I recall that when Kathy heard that each student in the Faculty of Education is now required to take a computer course, she wondered about the message being sent to the students. Was it a message that computers are approved by the educational system? Would they now be seen as a "taken for granted" component of teaching? Does this suggest that Education students, our future teachers, are going to become passive recipients of computers without questioning their value and place in schools? Does it mean they are about to conform to the system without inquiry?

While for many teachers computers are still considered to be an innovation, it is quite obvious that computers are largely and loudly promoted for schools. Many interests are involved in this promotion and not all of them stem from an educational point of view. The questions raised above reminded me of some of the concerns raised by Elbaz (1992) with regard to the growing technological world view which is common in educational settings. I join her with the thought that in order to balance this "one track" movement we need to provide a forum for teachers to voice the moral aspects of their knowledge with regard to computers.

It had been an enlightening experience for me to work with Kathy and Bonnie. This "enlightenment" applies not only to the insights I gained into the meaning they made in beginning to teach with computers. It also refers to the experiences Bonnie and Kathy shared with me as participants in this research. Some of my experiences with the research were described in detail in Chapter 4. For Bonnie and Kathy, participating in the research offered a way to voice their stories and to share their thoughts and feelings. They valued the opportunities for sharing their experiences and reflecting on their teaching without being judged in what they came to see as a safe place, close to their "real life" situations.

I heard Bonnie and Kathy "cry out" for ways to step out of their isolation as teachers, to be able to story and reflect publicly in a non-threatening environment on what they were doing and what they, as teachers, considered to be important. It brought to my attention, first hand, the need to think more about teachers' participation in research. It is clear to me that I can no longer imagine leaving teachers' voices out of research. In their daily practices, teachers are always involved in research, asking questions that arise from their practices, seeking information, inferring and making decisions. Each lesson is a "quiet" and private form of research (Duckworth, 1986; Cochran-Smith & Lytle, 1990; Britton, 1987). It can and ought to become public by teachers sharing their stories within the teaching community. The teaching community is all encompassing. It includes classroom teachers, university teachers, students, parents, and policy makers. I share Martin's (1987) view that teachers and their students are the essential sources of information about learning and teaching.

Far from a long held view that research is "done" to teachers or "on" teachers, my experience suggests that research ought to be carried out *with* teachers or *among* teachers themselves. Such a form of research is a negotiating process. Parts of such a process are carried out explicitly between the teacher and the researcher before the mutual work begins. Other parts of the process are an undercurrent, on-going negotiation that builds trust and respect between participants. The trust and respect are the core of any research. It is time to listen with a sympathetic ear to teachers' "close-up" stories, questions, experiments, and choices in "a middle ground" (Hollingsworth & Minarik, 1991). Moreover, teachers need not wait for others to initiate inquiry in their classrooms. They can be the ones to ask questions that arise from their work. They may also want to collect and record data, and share it among other teachers in their schools. they may want to form a "network of support" (Martin, N., 1987). To me, such a community of support seems an essential part in trying to break out of the traditional feeling of isolation by teachers.

I shared with Kathy and Bonnie a similar experience. All three of us encountered computers a short while ago. The three of us also wanted to become better teachers through a better understanding of computers. We all experienced computers differently. Nevertheless, our experiences also highlighted some similarities. The similarities as well as the differences complement and celebrate us as human beings. More than ever I became aware of the endless ways in which teachers use their knowledge. I believe these variations are not only a reality but also a *desirable* reality. With these thoughts in mind I have come to believe that some of Bonnie's, Kathy's, and my experiences with encountering computers may have been shared by other teachers who began to work and teach with computers. They may also be shared by teachers who plan to do so in the future. Nevertheless, those experiences are probably not universally shared. Thus, it was not my intent to present Bonnie and Kathy as *the* model of experienced teachers beginning to teach with computers. Rather I take the view that Kathy's and Bonnie's stories can be offered as "models of possibilities" (Bateson, 1990; Clandinin, Davies, Hogan, & Kennard, 1993). The quest into Kathy's and Bonnie's personal meaning of encountering computers brought to light, for me, Eisner's (1988) distinction between "seeing" and "recognizing". "Seeing requires sustained attention to the qualities of an object or a situation, it is exploratory in character. Recognizing is the act of assigning a label to an object. Once assigned and classification had occurred, exploration ceases" (p.17). I believe we are in need of more of the "seeing" aspect into teachers' experiences rather than the "recognizing" aspect. I hope I have contributed a chapter to the story of experienced teachers and their encounters with computers. There are many other stories yet to be explored and told.

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